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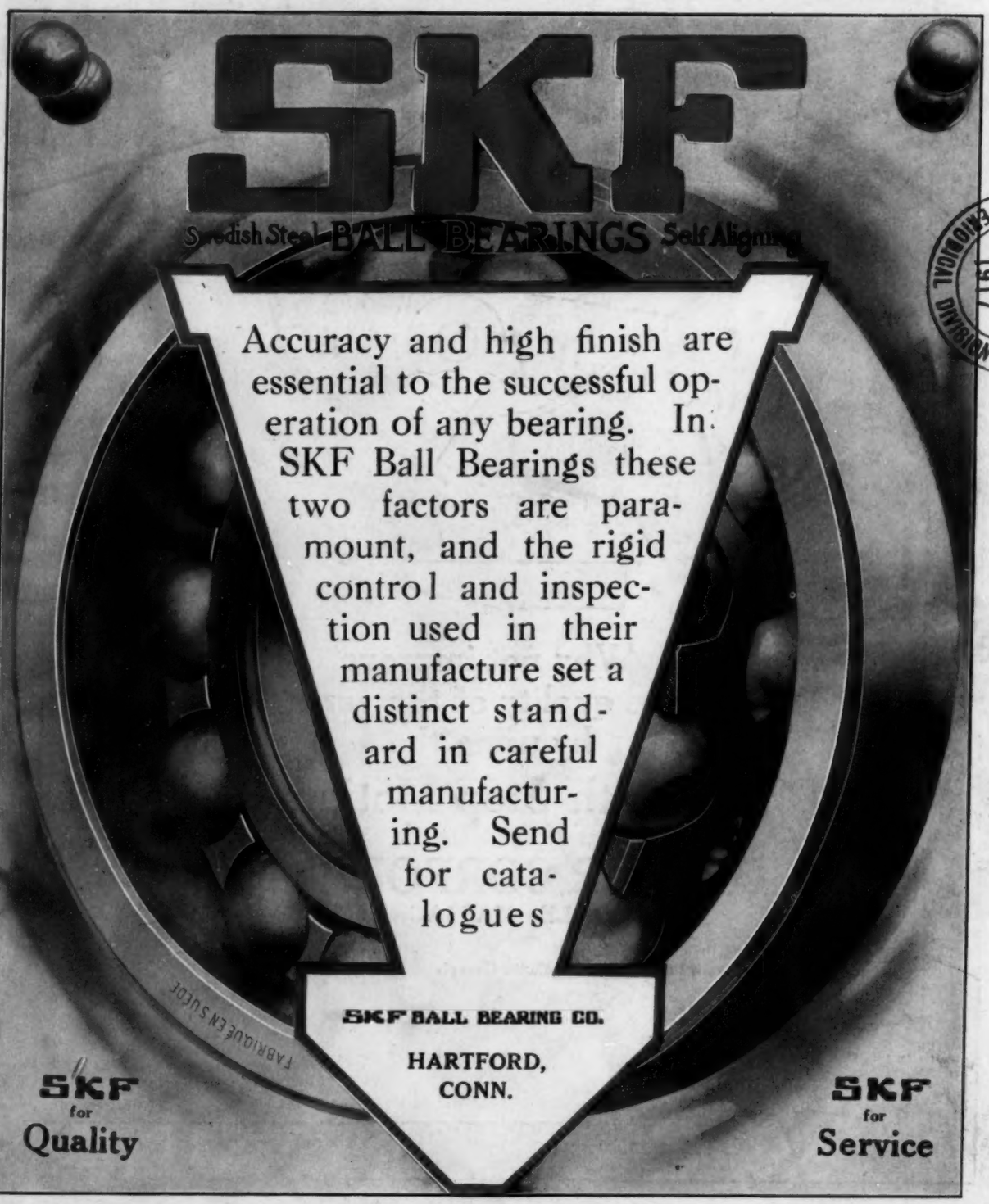
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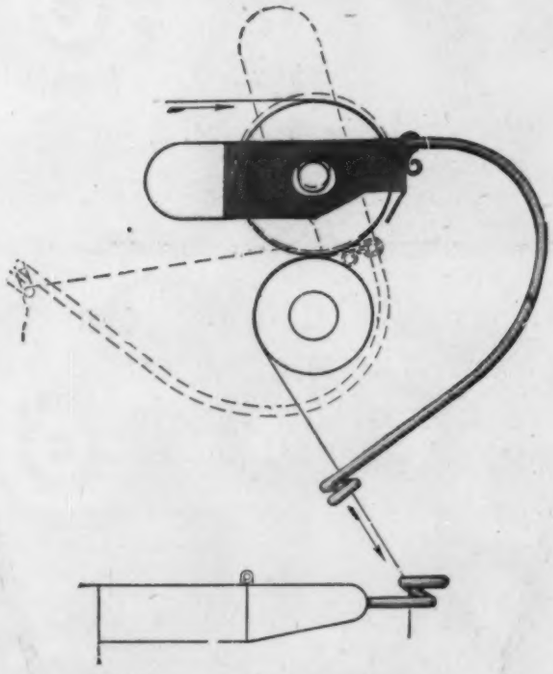

Why not improve the quality of the yarn by using the

Smith Stop Motion

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

Southern Office
188 South Forsyth Street Atlanta Georgia

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COTTON

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When changing address, notify us, not the postmaster. Always give the old address as well as the new one.

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GREETINGS

An old saying, but new every year—a Merry Christmas and a Happy New Year. The publishers of COTTON take this opportunity of wishing all of their friends the greetings of the season, and we hope that it may be our good fortune to continue to serve you.

EFFICIENCY IS THE KEY-NOTE NOW

The great war which is taking a large number of men away from industries demands that the most efficient and labor saving methods be used in factories throughout the country. These methods must be put into operation quickly because more men will undoubtedly be called into the service of the country.

It is our patriotic duty to go into active service of the country—we are not all physically fitted to do this, however, and besides some of us must do our patriotic duty by doing our bit behind the man behind the gun.

It is our patriotic duty to see to it that food and clothing are supplied to our army and our people. Efficient and labor saving equipment must be supplied to the mills quickly—advertising is the way to reach these mills in the quickest and cheapest way.

Undoubtedly the biggest advertising opportunity to be found anywhere just now is that possessed by manufacturers of labor-saving devices of all kinds.

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Never before in the history of the country was there such a shortage of competent labor and such a big demand for labor. The war has caused a withdrawal of men from the industries, and has caused a speeding up of industry to meet war's demands.

Not only has the maker of a product which will save labor an opportunity to increase his business, but by advertising it direct to the buyer through a medium which reaches these buyers, he is rendering quick service to his country and is helping to solve a big problem—he is in fact doing his bit.

Automatic loom manufacturers are helping out greatly at the present time. The mills using these looms are enabled to do much more work with fewer men. One weaver, in fact, is able to attend to twenty-four to thirty-six automatic looms.

Industrial tractors and trucks which have electrical power are also being used in many cotton mills to move material from one room to another. One tractor or truck takes the place of four or five men who were formerly used to convey material by other methods.

Many other efficient and labor saving methods might be mentioned which have been applied to the use of cotton mills.

Now the quickest way to reach these cotton mills is by advertising through the pages of COTTON. COTTON covers the Southern textile field very thoroughly—it reaches the men who buy and influence the buying for the mills.

The Perfect Belt Dressing
is
Dixon's Solid Belt Dressing

Put up in handy sticks and applied while the belt is in motion.

By using Dixon's Solid Belt Dressing every ounce of "pull" in a belt is quickly made available. Yet the composition of this dressing is such that the belt will not crack or harden.

Send for free trial sample. Address Dept. 34-O.

Made in JERSEY CITY, N. J., by the
JOSEPH DIXON CRUCIBLE CO.

Established 1827

DRAWINGS OF YOUR PLANT

This is a Photo of Our Drawing of the Springstein Mills, Chester, S.C.
WE CAN MAKE A PICTURE LIKE THIS FROM THE ARCHITECTS BLUE PRINTS BEFORE PLANT IS ERECTED
RUDOLPH J. SHUTTING CO. CHATTANOOGA TENN.

JORDAN MANUFACTURING CO.,
BOBBIN MAKERS

Home Office and Plant N. 1
MONTICELLO, GEORGIA.

Hardinge "Alert"
Portable Watchman's Clocks

3	station	system	complete	$38.75
6	"	"	"	42.50
9	"	"	"	46.25
12	"	"	"	50.00
16	"	"	"	55.00
24	"	"	"	65.00
32	"	"	"	75.00

Labeled by National Board of Fire Underwriters and approved by Factory Mutuals: Keys do not wear out: Guaranteed unreservedly: Shipped on approval: Prompt shipment: Service that *is* Service.

HARDINGE BROS., Inc. Established 1890
First and oldest Mfrs. of portable watch clocks in America
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GARLAND

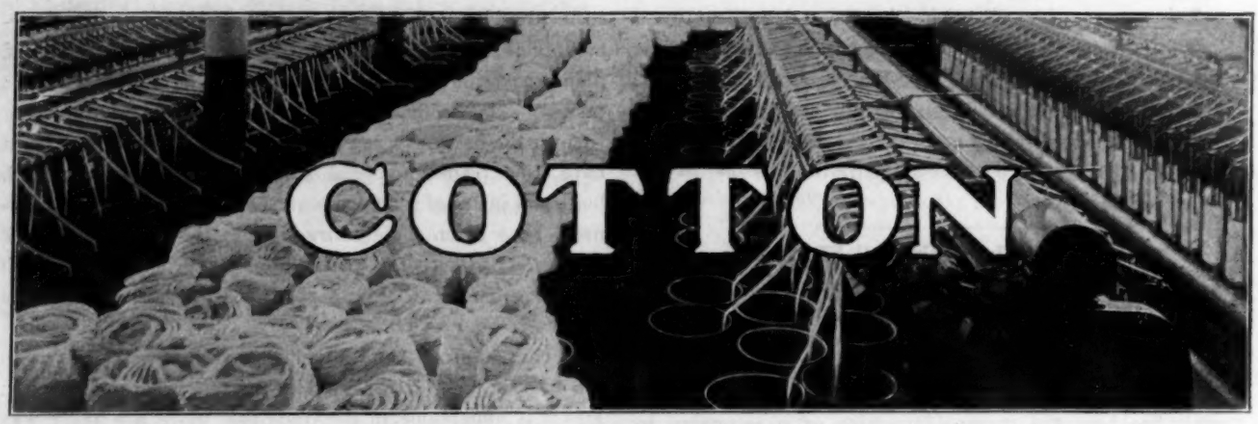
WHY NOT BUY LOOM HARNESSES

That always weave and wear the best?

No loom harnesses are made with greater care or subjected to a more rigid inspection in the various processes of their manufacture than the harnesses which we are turning out, and it is because of this care and this inspection that our harnesses are always of uniform quality.

G
TRADE MARK

GARLAND MFG. CO.
SACO, MAINE



December, Nineteen-Seventeen.

Recruiting Station Lessons.

There are many recruiting stations throughout the country, and some useful lessons may be learned from them.

The first lesson is that of the strength of organization. It matters not whether you visit one or a dozen such stations, the same methods of organization are followed. This organization may be likened to the employment bureau of an industrial plant. Whether it is a large or a small plant the essentials of the system are the same to a certain extent. The thing that will be noticed is that these organizations are so much more efficient than those at manufacturing plants.

While the factory requirements as to physical fitness need not be as rigid as the government requirements, to a certain extent their plans should be followed. Not only the physically fit, but the mentally alert are required. The point that stands out above all others is the standardization. Much of this can be attained in factories having welfare departments.

In business one often hears the human interest spoken of. In business the surroundings are such that they usually can be bettered easily. In the army or navy the surroundings cannot easily be changed. In fact, military surroundings as a rule cannot be changed at all; but must be taken as they are. Therefore it is necessary that the military arm of the government see that they get physically fit and mentally alert men from the start.

After having assured themselves of a man's physical fitness, the next step is to find the branch of the service to which he should be assigned. The army has several branches and the navy likewise. This is where the mental state comes in. While a man can choose either army or navy, after he is in he can be assigned to different branches according to where he will show the best results. Of course if he objects to the branch to which he is assigned he will be changed. For instance if a man joining the army has mechanical skill he may be assigned to the aviation corps unless he objects. Of if alert, to the artillery. In the navy the alert man goes to gun crews. It is always borne in mind, however, never to assign a man to any branch to which he does not wish to go. This is on the assumption that no man can or will do his best unless perfectly contented. Human nature in the army or navy is no different than it is in business.

There are a great many men who have only good health and upright character. By placing these under men to be trained for the work for which they are intended, they get a certain amount of skill in that line. The idea is to drill a man so that, even though he has never been under fire, it becomes second nature for him to keep on sighting his gun and firing. A well trained man will stay on the job of sighting and firing regardless of his personal feelings. The lesson from this is that any new man in your factory is only a "rooky" and may require training, just as much so as a new man in the army or navy is a "rooky" requiring training.

The biggest lesson, however, is that implicit obedience to orders is expected and required. The very first thing a man must learn is to follow a superior's orders. This is a good lesson to apply to business. Teach the business of industry as the army teaches its business of fighting.

The army teaches another thing. A majority are only average and therefore remain privates. The exceptional ones rise to be officers—in business to be foremen. Business managers should work out this principle. That is, pick out those above the average and give them a short course of intensive training. In this way they get the best

Taking Nitric Acid From the Air.

It is currently stated that American chemistry has scored another triumph in providing one of the prime essentials in the conduct of the war. This is the patented process of the General Chemical Company for taking nitric acid from the air, and the importance of this achievement is emphasized in the taking over of the patent by the United States Government, which, it is understood, will build a plant in Alabama for the immediate production of nitric acid. For this purpose, it is stated, $3,500,000 has been set aside.

Germany has been taking nitric acid from the air by the Haber process, a method which requires great pressure and high temperature. The special feature about this new process of the General Chemical Company, is not alone

in the producing of nitric acid from the air, but in the fact that its process requires less pressure and lower temperature than does the Haber process.

This country, like all others, has been dependent upon Chili for nitrate of soda, which when treated with sulphuric acid produces nitric acid. Since the outbreak of the war, supplies of nitrate of soda from Chili have been reduced to a minimum, and until a method for extracting nitric acid from air was perfected the United States was one of the chief sufferers.

Again The Pink Boll Worm.

Recently it was discovered that the pink boll worm existed in large numbers in fields near Beaumont and Anahuac, Texas. This was the second time within two months for the discovery of the pest in the state of Texas. The result has been the prompt launching of a campaign by representatives of the State Department of Agriculture and of the Federal Government against the worm. The action taken will, it is believed, prevent a further spread of the cotton pest in the points of infection mentioned. When the discovery was made that the pink boll worm had invaded this country a second time, a force of state and federal entomologists headed by Dr. W. D. Hunter, federal entomologist in charge of the eradication of southern crop pests, and E. E. Scholl, chief entomologist of the Texas state department of agriculture, proceeded immediately to the infected localities and inaugurated a vigorous campaign for eradicating the insects. A large force of laborers were set at work gathering the cotton stalks and burning them in the fields where the pest was found. The introduction of the boll worm into South and East Texas was due, it is said, to the importation nearly a year ago of several carloads of cotton seed from the Torreon district of Mexico. The state department of agriculture, under the direction of Mr. Scholl, recently sent nineteen expert entomologists to the Mexican border to enforce a strict quarantine against the possible entrance of the pink boll worm from that country.

American-Made Dyestuffs Win Favor Abroad.

The American dye industry has not only grown big enough to supply practically all domestic needs, but is now exporting important quantites to other nations. In July nearly $500,000 worth of aniline dyes were shipped abroad, according to figures published by the Bureau of Foreign and Domestic Commerce of the Department of Commerce. This is the first time that separate statistics for aniline exports have ever been issued, the innovation resulting from the recent striking growth of the trade.

Of all the industries created or developed as a direct result of war conditions, none has shown more rapid progress than American dyestuffs. From only seven establishments in which 528 people were engaged in producing 6,619,729 pounds of coal-tar colors, valued at $1,126,699, in 1914, the industry has developed until now it not only supplies the domestic demand for colors but has even invaded the foreign market in European neutral and allied countries, Canada, Mexico, Argentina, Brazil, British India, and Japan.

No other article of commerce more vitally affects a greater number of industries than do coal-tar dyes, and very few articles rival them in complexity of manufacture. At the outbreak of the war the difficulties in the way of soon providing adequate domestic supplies seemed insurmountable; yet in the short space of three years scores of plants covering many acres of ground have been erected; numerous by-product coke ovens have been equipped to furnish the necessary raw materials; thousands of workmen have been trained; special machinery has been designed, built and installed; hundreds of chemists and chemical engineers have given their entire time to the unfamiliar work connected with color production, experimental research has been inaugurated for perfecting processes and machinery and the possible discovery of new colors; organization, consolidations, and alliances have been effected within the industry to further increase output at decreased cost; and it is understood in the trade that plans are under way for entering foreign markets on a large scale.

Sixth National Textile Exhibition.

Owing to the great interest which is being manifested in the Sixth National Textile Exhibition which is to be held in the Grand Central Palace at New York City from April 29th to May 11th, 1918, the Board of Directors have unanimously voted to take additional space in that building and have recently closed a contract for what will be know as Department "D." This means that they will have four full floors of exhibits and that the exposition will be as large, or larger than any show of its kind ever held in New York, with the exception of the Automobile Show which occupies the same amount of floor area.

In reference to the finished products' department which will be the department known as Department "D," it is of interest to know that the Merchants' Association of New York and the American Export Association are co-operating and have decided to establish headquarters for visitors from foreign countries during this exposition. It is their intention to form an association for showing proper courtesies to these visitors and to provide them with convenient facilities.

All the vital features of Government export control, stripped of their legal verbiage so that the busy man may grasp them quickly, are explained in the pamphlet "The Regulation of Exports Under the Espionage Act." which has recently been issued by the Guaranty Trust Company of New York.

This pamphlet, which is of particular importance to those concerned in foreign trade, contains the list of articles which cannot be exported without licenses, and makes clear the restrictions governing the two distinct classes of exports under Government regulation. One of these classes relates to the shipment of articles to the enemy and to European neutral countries; the other to certain commodities whose export is prohibited to countries other than those named in the first class. A list of destinations to which shipments are not permitted, and a list of those to which shipments are allowed under licenses, are included. How and where licenses may be obtained, and the nature of the information required to fill out the forms of application are also clearly outlined.

Plant Lighting for Protection.

The proper use of artificial light about industrial plants for protective purposes during wartime is a subject that has been "brought home" to a great many plant managers this year. The need for engineering assistance has resulted in numerous requests for information.

The engineering department of the National Lamp Works of the General Electric Company, realizing this need, has prepared a bulletin covering, to a limited extent, the general information required. They say that while no definite rules of practice can be laid down that will cover the needs of all plants, the needs of each being largely dependent upon the degree of protection which the plant management will wish to assume, the following suggestions should make it possible to select a method of lighting to meet the requirements of any case at hand.

There are certain general principles of illumination that must be observed in this as well as in other fields of lighting, regardless of the type of installation that is to be used. An object is seen in detail by the light which comes from it to the eye and not by the light that comes from the light source to the eye. The aim, therefore, is to throw the light upon the object to be seen and to have as little as possible of the light coming direct from the source to the eye, for a bright light in the field of vision makes it difficult to see any object of decidedly lower brilliancy, as, for example, a man dressed in dark clothing, in the same visual field. An object is often discovered, however, in silhouette, that is, by means of light coming to the observer, not from the object, but from a location beyond the object. It is a recognized advantage in military practice for a sentry to arrange if possible to have any intruder between himself and the sky, when illumination is deficient, before the challenge is given. In artificial lighting, any moderately illuminated area such as the area beneath units or an illuminated fence or building takes the place of the sky as the background. Of course, while it is easy for the guard to distinguish a man by means of his silhouette, it is impossible to distinguish any detail other than the outline of the figure—a condition that would seldom render identification at a later time possible.

Glare must be avoided. Glare is the result of a light source extremely bright with respect to its surroundings located directly in the field of vision. It is best overcome in the case of protective lighting by mounting the units at a sufficient height to bring them above the ordinary angle of vision and by shading the lamps by means of suitable reflectors. In any form of emergency lighting where the installation is considered likely to be temporary, there is very liable to be a tendency to mount bare lamps on any convenient poles that may happen to be available, without thought of the illumination results of such an installation. It will be recalled that in principle exactly this same procedure is used on an intensified scale in theaters when it is desired to screen the stage from the view of the audience without lowering the drop. A large number of glaring lights in the line of vision of the audience obscures the stage in apparent darkness while the scene shifters are at work without being seen, yet with ample light for their needs. Bare lamps in the line of vision tend toward placing the guard in the position of the unsuspecting audience, while the trespasser enjoys the advantages of the scene shifter.

In addition to minimizing glare effects, reflector equipment serves the very important purpose of distributing the light which emanates from the lamp filament in all directions into directions where it is most useful. Almost any desired distribution of light is obtainable from reflectors at present on the market. For purposes of protective lighting, five main types are especially useful. These are:

A—The opaque angle reflector, which gives a broad distribution of light directed principally to one side of and below the unit, and is suitable for illuminating fairly large areas;

B—The opaque dome-shaped reflector, which gives a broad, symmetrical distribution of light and is suitable for illuminating fairly large areas beneath and on all sides of the unit;

C—The refractor unit, which gives a very broad, symmetrical distribution and is suitable for illuminating very large areas with wide spacing distances between units;

D—The flood-lighting projector, which gives a concentrated distribution, in which the light is confined principally to a beam of about 25-30 degrees width capable of illuminating objects a considerable distance away;

E—The searchlight, which gives a highly concentrated distribution in which the light is confined to an extremely narrow beam capable of illuminating comparatively small objects at great distances.

Although this field of lighting is new in the nature of its demands, and practice has not been standardized, there are, fortunately, lighting appliances which meet all the requirements of precautionary lighting. As previously stated, a number of good reflectors of the general types mentioned are at present on the market. Good results can be obtained from any of those of reliable manufacture and the ease and promptness with which they may be obtained will probably be of greater importance to the plant owner than small differences in efficiency.

In accordance with the foregoing, the following suggestions are given for:

First—Plants occupying all or parts of city blocks, with neighboring buildings near them;

Second—Plants located in open spaces and surrounded by an expanse of vacant land.

The following suggestions apply to a typical plant located in a city factory block where the building is close to the street and occupies all or a considerable portion of the block. The buildings on the opposite side of the street make it impossible to place a zone of light at any great distance from the plant. In fact, the zone will have to be confined to the width of the street. If the street lighting of the neighborhood is of high standard, it may furnish all the protective lighting needed except for obscure nooks and corners, which will have to be locally lighted. However, in the majority of cases in such locations the street lighting is not of a high standard, and if improvements cannot be effected expeditiously, the problem becomes one of supplying special lighting for the building under consideration.

In most cases, the lighting units may be mounted to the best advantage on the building itself. The light distribution should be such that the full width of the street will be illuminated. This calls for an extensive rather than a concentrated distribution. In most cases angle reflectors are best adapted to this type of lighting.

It is necessary in the lighting of a plant centrally located to give consideration to the comfort of those who rightfully use the streets as well as to that of the guards whose duty it is to prevent trouble. Hence the lighting units should be mounted well above the line of vision of those who pass near the building and screened from the view of those who see the building from a distance. In many cases, if the units are tipped at a slight angle, the reflector will screen the brilliant filament and thus accomplish this result. The angle reflector should be mounted so that its light is directed away from the building. To accomplish the screening of the light source referred to in the previous paragraph, the reflector is tipped in so that what is normally its vertical axis is at an angle of 15 degrees with the vertical.

Hanging the units high has the advantage that a relatively smaller number of larger units can be used at greater spacing distances with resulting decrease in installation expense. However, as a general rule, no advantage is gained by exceeding a mounting height of 50 feet. At such a mounting height, a spacing distance of 100 feet between units should provide sufficiently uniform illumination. With such an arrangement of units, Mazda lamps at least no smaller than the 200-Watt size should provide a fair degree of protection, although higher wattage lamps are necessary where extreme precaution must be taken. In at least one installation, 500-watt lamps were deemed necessary with approximately this location of units.

In case units mounted near the roof of a building would not be more than 30 feet above the ground the dome reflector should be considered. In no case should the mounting height be less than 15 feet. The spacing distance should not exceed two and one-half times the mounting height, and 100 to 200 watts in each unit should give satisfactory illumination. If provision can be made for mounting the units over the center of the street, less light will fall upon the building and, therefore, appreciably better illumination will result.

For the lighting of alleyways between buildings, dome-shaped units hung over the center of the alley or mounted on brackets extending over the alley are recommended. Here again the mounting height should preferably be not less than 15 feet nor more than 30 feet, although a spacing between units of three times the mounting height should provide sufficient uniformity. The wattage per unit should range from 100 to 500, depending upon the spacing distance and the color of the surroundings.

Plants located in outlying districts and surrounded by an expanse of unoccupied land afford a greater choice as to the type of lighting system to be used. For example, the effect of glare upon the passerby, which in the case of the centrally located plant must be given careful consideration, may in a great many cases be ignored due to the fact that very few persons pass the plant at night, and in the majority of cases those who do pass near enough to be annoyed by the glare are trespassers on company property. The zone of light surrounding the plant need not be so closely defined and may be extended some distance from the plant to good advantage. With this zone of light established about the entire plant, the need for lighting each building individually is reduced, although sufficient additional light should be provided in accordance with methods already described to enable the guards to make their inspections with thoroughness.

One form of zone lighting consists of a series of standards surrounding the entire plant supporting lamps properly equipped with reflectors. If dome reflectors are used, the units should be mounted at a height of not less than 15 feet above the ground; the spacing of units with this type of reflector should not exceed three times the mounting height. A 100-watt lamp will be satisfactory with a mounting height of 15 feet. By mounting the units higher, and using a larger unit with correspondingly wider spacing, the advantages of lower installation cost and greater width of zone may be realized. The wattage of lamps will necessarily be increased with the mounting height, and in a somewhat greater ratio. If refractor units are used, the minimum mounting height should be 20 feet and the spacing not more than six times the mounting height. Lamps of 300 to 500 watts should be used. The wider distribution of the refractor unit is of advantage not only because it permits wider spacing between units, but also, it will be observed, because it covers a wider zone effectively.

Plants in outlying districts are not infrequently enclosed by some type of fence. This need not interfere, however, with the installation of the system just described. The units may be mounted on poles extending above the top of the fence so that their light is distributed on either side of the fence. If the units are mounted directly over the fence rather than to one side or the other, dense shadows made by the fence which might furnish a lurking place will be avoided.

From the standpoint of electrical distribution, where the area to be covered is extensive, the comparative advantages of series and multiple systems should be considered. Series systems employ lamps of the street series type and require the installation of constant-current apparatus.

A type of zone lighting which is being employed effectively at present and with the important advantage of extreme simplicity of installation to recommend it is that using flood lighting units. For zone lighting, a reflector which concentrates practically all of its light within an angle of from 25 to 30 degrees is most desirable, since a more concentrating reflector will illuminate too narrow a zone at ordinary mounting heights. The guard should patrol the plant in the same general direction as that in which the light is projected. By keeping himself in the shadow, the guard not only is inconspicuous, but is spared the necessity of having to face into the beam of the bright light sources. It must be borne in mind that while the guard will ordinarily not be in the brightly lighted zone, occasion may arise which will necessitate his not only being in the lighted zone, but also, perhaps, his having to face in the general direction from which the light is coming; hence, the higher the units are mounted, the better from this standpoint. Units of the 400-watt size spaced at intervals of 200 feet and mounted at least 10 feet above the ground should prove satisfactory. An installation of this type often represents the least expensive system of protective lighting which may be installed. Here, as in previous cases, there should, of course, be adequate lighting in and about the plant as a whole to provide for effective patrolling.

Another method in which flood lighting units may be used to advantage is by mounting these units at various points about the buildings and flood lighting the surrounding grounds. If the units are mounted at a considerable height, the matter of glare as affecting persons approach-

ing the plant will not be serious. The flood lighting units in this case are used only to form a zone of light about the entire plant, and not to furnish local lighting for the different buildings. It is impossible to make general specifications in regard to the number of units required, since this will depend not only upon the extent of the illuminated zone desired and its distance from the plant, but also upon the locations available for mounting the units.

A modification of this system is one in which a number of flood lighting projectors are mounted on a watch-tower overlooking the grounds. By means of these, the guard located in the tower commands a view of a lighted zone entirely surrounding the plant. A swivel searchlight giving a highly concentrated distribution may be used advantageously to supplement the fixed lights in penetrating unlighted areas. Since it is difficult to see objects clearly through the beams of a powerful searchlight, arrangement should be made for controlling the play of the searchlight from a point several feet below the unit.

While the discussion has been centered about industrial plants, the same general considerations apply in the safeguarding of bridges, docks, railway centers and other points of strategic importance. Here flood lighting units offer exceptional advantages, for by means of the projected beam it is possible to reach with little difficulty places where the installation of local units would be almost impossible. Furthermore, by means of a few of these units the lighting of important approaches may be effected on very short notice.

Observations of a Traveler.

BY "SIGMA."

To one who has had a varied experience as a traveler among the mills throughout the length and breadth of North America, the varied methods used in the management of the plants has been of intense interest and the source of careful study. Of course there is only one good way of managing a business enterprise. While it may vary some, in the main there are three links, which, to the good manager, are always firmly welded to the business, namely, abundant production, quality and economy. These are the three things upon which the success of the management rests, after taking it for granted that the fundamental blocks or stones upon which rests the business are right—like the capital, plant, market, etc. Now there are everywhere established businesses which are being "managed." What are some of the methods pursued?

It is a fact that some managers are more full of faults and short comings than their lieutenants. Some of them, even going so far as to do the opposite things to those which lead to success, and then blaming their assistants. For the convenience of the reader, we will group some of the different methods under their proper headings as follows: 1. The successful way. 2. The over conservative method. 3. The "Pet Lamb" style. 4. Managing by the "hear-say" system. 5. The tramp gait. 6. The extravagant course. 7. The Barnyard Medley. 8. Report Galaxy. 9. The lean proposition. 10. The reign of terror grip. 11. The family mill. 12. The curiosity shop. 13. The don't-care Ruse. 14. The skin game plant.

Taking up these various methods of management, some very interesting things are revealed. First, the successul way is a well known route to many mill men, big and little. Happy is he who manages or works under the successful method. What is the successful way? Its faults are reduced to clinker and ash, from which paths are made to walk on. The policy, as a rule, is liberal, yet conservative enough to be safe. Everybody has a square deal and all have a fair chance. There are no pet lambs, no tramps and all is strictly business without neglecting welfare, work, and the cracking of a good joke occasionally. The management is above criticism. The help have no chip on their shoulders, neither do they have excessive love feasts. Everybody knows their place and there is no undue mixing.

The over conservative style up to a certain point moves along much the same as number one with the exception that the policy is much less liberal. Everything is over scrutinized, nothing is quite good enough. Nobody is quite efficient enough to be promoted. No man is hired unless he comes along with a horse-shoe or rabbit's paw in his hand. All must pass through a lawyers office as it were, and the cost of the "looking up" often defeats the profit that would have assumed shape, if the management had been less conservative. The extremes to which this system is carried can be shown by the methods of one prominent American mill manager. When he wants to engage a superintendent or agent, he hires a lawyer or a detective to trace the candidate's pedigree and record complete down from the day of his birth. And yet this manager is not so successful in making up his organization, as he changes men too often. The over conservative man is always shy of new methods and new machinery and makes less money than the manager with the liberal policy.

The "pet lamb" system is one of the most aggravating with which the progressive man has to contend. The pet lamb is a very elusive character. He has many schemes up his sleeve to prevent the growth of the pet lamb society, and the pet lamb manager, is remarkably, one of the same kind too. There are never more than just so many pet lambs in the plant. This may vary from one to a score or more, but no pet lamb ever knows or recognizes that there are others like them in the plant. He or she firmly believes that there is only one of them around, and the manager is very careful never to tell any one of them that there are others. Years ago, an overseer once asked the superintendent when starting on a new job, as to what a certain well dressed girl did in his department, "Oh," said he, "never mind what she does, she is my girl, I'll look after her."

Pet lambing in any mill is a bad, bad thing. It may surprise the reader that there are men pet lambs as well as other kinds. It is a painful situation when a man takes a job as superintendent, to be told that in one room or in another there are men and women that he must not govern; that they are fixtures as it were; assistant owners that help to run the plant; and it is a fact that they are quite successful partners in the business as a rule. They will work early and late, also over-time if necessary. Such a system causes a great deal of trouble and creates strife. It puts the whole plant in fighting trim, and most of the help spend more time defending lies and imaginary grievences than they do at producing goods.

The "hear-say" system is usually adopted by a man who

prefers to sit in the office rather than hustle around and see things for himself. While it makes it easy for him, it unconsciously places a premium upon the biggest stories that can be hatched, upsets and defeats the object of good government all around. The best way to fight and kill the "hear-say" system, is to "hear" a lot of shim-sham stories about the manager himself, and go and tell him that the whole plant is being talked to pieces over his ear-to-the-track style of management. The hear-say form of management is more prevalent than one would suppose and it is one of the most uncomfortable situations with which an overseer or superintendent can come in contact. There is no dependence upon this form of government. The words of the inside men are always discounted in preference to the statements of outsiders. The chief executive usually gets his information through "pals" who hang around at night in saloons, barber shops, and street corners, where some mischievous eavesdropper exaggerates everything. The next day the chief executive knows all the "inside workings" of his own plant. Simple troubles and slight derangements which have been already smoothed over, have to be rehashed at the office the same as though the breaks were fresh and unfixed. This form of government creates distrust on all sides. The whole plant gets to talking shop wherever it exists and starts false alarms to stir up things to no good purpose.

The "tramp method" in a mill is not a success, but it can be put down to its credit that there are no "pet lambs" roaming about in a tramp mill. In this kind of a mill nobody has a regular standing; anybody is hired and the shorter time they work, the better everybody likes it. It is a fact, that not many years ago, a weaving plant making its own yarn preferred the tramp weaver altogether. It was said that the annual dividend of the plant was actually derived from discounted payments made to tramps who would allow a discount in their pay if they could get it without working a notice. Another source of income was from uncalled-for pay envelopes; tramps having left without settling with the company and having never called for the pay due them after the regular pay day. Tramp mills not only have tramp help, but also have tramp officials, to a more or less degree of importance. Each new official brings on his "me-too" gang and later they may also depart in a body when their leader takes "French leave." It is needless to add that under this system of management, the demoralizing effect upon the community is painful to observe.

With the extravagant method of operation a plant has another bridge of sighs to cross and another cross to carry. It is the parlor car system of running a plant. Nothing is too dear to undertake. All kinds of experiments are indiscriminately indulged in. The elaborate office fixtures, expensive catalogues, and with needless expensive improvements (so-called) being made all the time, give the place an air of supreme independence. Orders for goods that cannot be made are constantly being taken at a loss to the plant. In one mill an agent bought enough lug straps to run his plant for three years. Later it was found that the interest on the money tied up, the depreciation of the goods, the cost of the storing, the change of the style of lug straps and the decline of the market, caused the plant a heavy loss on this apparently unimportant transaction. It was a case of "being a penny wise and pound foolish." In this kind of a mill, there is usually a long list of pensioners and high salaried officials who seem to be very busy, but are accomplishing nothing, and yet more of the same kind are being engaged all the time. All kinds of long useless business trips are being taken at the company's expense, the various participants of whom always travel in parlor, dining and sleeping cars. Long distance telephones and cablegrams take the place of correspondence by mail. All this goes on until everybody wonders where the money comes from, and how long this can last. The desks, supply rooms and the store-houses are filled with goods that nobody wants. In one of these mills an overseer of ring spinning had ring travelers enough on hand to run the place for ten years. In such unwisely governed plants, the crash does finally come and the faithful but deluded stock holders cave in and lose their shares. The surprise of it all is that nobody seems to realize how in the world it ever happened.

The "barnyard medley" adds another plant to the collection of mill catastrophies. The fatal mistake of this style of mill management is that nobody is properly vested with suitable authority, nobody knows exactly just where he stands and what position he holds, nor just where his authority begins, nor where it leaves off. Every responsible man in any plant knows that in order to be of any use and to succeed in doing his principals justice, he must have the proper authority which measures up to the office he holds. His territory as well as his responsible scope must be authorized. When this system is not carried out, the plant becomes a regular barn-yard medley. The bantam rooster roams about as freely as the favorite horse and is more often heard. There is a great deal of cackling all around, and at times all the birds want to flap their wings at one time and all the roosters want to crow at the same moment. There is no law and order and all goes downhill very rapidly. This system is somewhat a combination of all the other loose methods.

"The "report galaxy" is a plant run on paper. The head man never leaves his office. Hundreds of clerks from beginning to end are kept busy figuring the cost per pound, per hour, so to speak. There is a vademecum for every sub-department. It really costs more per pound to find out these departmental costs than it does to produce the goods. Everybody knows that the plant is run on paper and fancy reports. In fact the whole plant has gone report crazy. Almost every hand carries a handful of pencils and pockets full of writing pads. Stock accounts is taken every week but few officials over look at the stock in process. So long as the reports look well, everybody is happy and the reports are kept well "fixed." Everything is figured down finely and the profits big, but, somehow, the safe goes empty and the crash is bound to come.

The "lean proposition," is the opposite of the extravagant system, and differs from the whole conservative way. Under this regime it is cheaper to stop a machine for a week than to buy a belt to replace a worn out one. The whole plant may be tied up for supplies. Cotton and coal frequently run out. For example, one mill left the departments so short of brooms that some of the overseers got disgusted and would send out and buy a dozen or so to sweep clean on Saturdays. Orders big and small were daily refused because they thought they could not be filled.

The plant was tied up in some departments for want of skilled overseers and good help. Everything was run on a cheap scale. Such mills are usually short of bobbins, spools and all else. Everything is rotten with cheapness and the mill usually goes fast.

The "Reign of Terror" had a grip on another system of mills. To work in them was to swear away one's liberty. The help were unconsciously owned by the corporation. There were internal and external detectives and spies galore. With such a system as this everyone is closely watched. All are thought to be rascals until proven honest. Nobody is trusted. The money in the safe is counted three times a day. In one mill the time was kept or marked in the time book four times a day. The first record was in the morning, by making a mark in the forenoon square. At nine o'clock the time or presence of every hand was again looked up and a dot was made after the mark. At one and three o'clock p. m. the same was repeated in the afternoon square.

In years gone by there were some "family mills" that were an addition to the "seven wonders." In these mills nobody knew how to run the mill but the family and nobody knew much anyway. In a place like this there may be three or four members in the family who act as managers, the more the better for the family. Each member has his special hobby which must be catered to. One member even insisted upon having an oil tank kept in the office, presumably to oil the ledger hinges. The most embarrassing feature of the family style or cabinet system of managing a mill is the difficulty with which a measure, no matter how desirable, can be put through. Even when a matter is decided upon, some member of the family who may not have been present, at a final decision, or who changes his mind, may rush in from New York, on a midnight train, and hold up the whole business. To tell the truth a prominent small mill before the scattered cabinet could be assembled, waited to the breaking point before deciding how many ends they would have in a certain line of goods. It was hastily decided to run a scant number of ends, although one member held out for a higher count. When the goods were half way through, the mill, the "off member" won his grounds. All the other shouters saw their mistake at a tremendous cost and a loss to the company. The hundreds of scant warps already made were pieced out. All this miserable way of manufacturing for want of a good local manufacturing head who should have been in full charge to represent and protect the family and all other interests.

There are a few mills throughout the land that are veritable curiosity shops. There is no joking about this. Each of these mills is usually a one man owned mill and managed by him alone. He owns the earth under it and the sky over it. He is responsible to nobody and cares for nothing. Every whim takes its wildest course. There may be wooden lathes, wooden looms, and everything may be topsy turvy everywhere. Such a plant usually has a monopoly of its product which commands a big profit or it could not possibly pay to operate in this way. No cost sheets are kept and there are no daily nor weekly reports. The entire plant is honeycombed with pigeon holes, odds and ends, subways, tunnels and bridges. A few of the most successful, money making plants in the United States, were run this way for years and made big profits. However, in these days such mills cannot long survive and operate in this way. One has already changed its course and the tide is turning on the others.

Mills not properly managed are fast sinking into the quick sand of oblivion.

Advertise Your Trade-Mark.

BY L. W. MIDA.*

"Me no wantee lat, me wantee chop allee samee White Lose."

Thus a discriminating Chinese in far Pekin, in his pidgin English.

He wanted only goods with a White Rose trade-mark.

It is the same the world over. The chop or trade-mark is the greatest salesman in the world of commerce, and not the least so in the markets at home.

American manufacturers appreciate this to the limit. Ocular demonstration of the fortunes being built daily through the use of trade-marks and brands has shown them. Nowhere on this earth is the favorite brand of the buyer or consumer more insistently called for than in the United States.

When a concern puts a new line or item of goods on the market it usually, therefore, adopts a trade mark or brand. It engages an artist, engraver or lithographer to get up a nice looking and attractive mark or label. The services of a patent attorney are employed to make a search through the files at Washington. The trade-mark is duly registered. To the minds of the registrants all is finished; they have fully protected themselves and they proceed to spend money in popularizing the brand or trade-mark in their own particular way.

But—they have only scratched the surface. Besides registering a trade-mark they may have registered a "bunch" of potential trouble that will give them many sleepless nights and worrying days.

Their trade-mark or brand may not be worth the paper it is printed on; and this is spite of the Washington registration and other precautions.

For every trade mark that has been registered at Washington during many years, there are hundreds that have never been registered. And every user of those unregistered brands may have a prior right to use his mark under the common law. He is protected under the common law and can make it legally hot for the concern who uses even a colorable imitation of that mark or brand.

A concern which has not taken the necessary publicity and search measures may be using a mark or brand that is an infringement on some other hidden away in a corner of the United States. It may be doing it innocently but some day the hand of fate will fall heavily on its shoulder and an expensive law suit may be the consequence through that ignorance.

The condition of uncertainty is vividly illustrated by the experience of a Chicago organization specializing in research and registration of trade-marks. They find that of the marks submitted to them, close to 75 per cent are in conflict with the same or similar marks in use by competitive concerns or that the mark is not of such character as to be a subject for protection by federal registration.

*President of Mida's Trade-Mark Bureau, Chicago.

No better emphasis is required of the necessity for a central source of information to pass upon the validity of marks before introduction in the markets. While the records of the Bureau referred to have been compiled with fidelity and regardless of expense for over a quarter of a century, and the records are as exhaustive as humanly possible, there is still another channel of search that should be used—advertising in the trade press. This advertising should start with the very inception of adoption of the trade mark, so as to bring to light any slumbering claims not on public record. A campaign of advertising in the trade press, as a continuous warning, has its own distinctive value.

The whole goodwill value of a trade-mark lies in continuous, unrestricted use and above all, in publicity. It must be made known to the greatest number of users. The enormous values of the Gold Dust Twins, of the Old Dutch Cleanser and of many other trade-marks that will come to the mind of the reader, were built by persistent advertising. The more publicity the greater the value of the trade-mark.

Then the advertising of a trade-mark is another form of insurance. You insure your factory, you bond your employees. Why should the value of a trade-mark not be insured by advertising?

When a trade-mark is advertised it is made known to its specific trade that it has been adopted. If there are any unregistered trade-marks existent which conflicts with the advertised mark, the matter is brought to a head at once. The advertiser insures himself against future litigation by publicity. And in the light of what has already been stated regarding the trade-marks submitted to the Chicago Bureau, the few dollars spent on this kind of advertising will be well spent indeed. If the trade-mark advertised is all right there is little to fear, but if it is all wrong—and recollect once more the percentage of rejections mentioned—the advertiser is prevented from spending a large sum of money in promoting it.

The Federal Courts have taken note of this phase of trade publicity. A Federal Court Judge in the well known "Rex" case, held that it was the duty of one adopting a trade-mark to bring it at once to the attention of the public on the theory that in the absence of a wide-spread knowledge of the existence of the claim to the mark others will be likely to adopt it and spend their money on its promotion in their own interest. It was held to the detriment of the claimant in this particular case that no newspaper or periodical advertising had been employed to exploit the mark.

The courts have also, on several occasions, indicated that where an owner of a trade-mark is not prepared to make universal proclamation of possession, it will be regarded as evidence of his intention to conform to the spirit of the law, if it is shown by him that a fair amount of advertising has been done in his trade press, so that his own trade may be made cognizant of his ownership.

This means that by advertising in your trade press you have taken a great measure of legal precaution and if trouble arises you will find yourself so far protected.

Many manufacturers, however, are like the ostrich which hides its head in the sand in the belief that its huge body is not seen. To quietly go ahead using a trade-mark or brand in the hope that one is doing it so silently that no competitor will notice and one will be saved legal complications, is a wrong and foolish policy. It is only saving up a stick for one's own back. It is like sitting on the edge of a volcano that may burst into activity any day. The aphorism to "let a sleeping dog lie" cannot be applied here. The sleeping dog may awaken at any moment and bite cruelly and hard.

Those statements apply not only to new brands and marks but to those already in use. Unless it is certain that searches of the complete unregistered records have been made, no owner can be certain that his present marks and brands are valid. In view of the tens of thousands of unregistered trade-marks now in use under the common law, the chances are that they are not.

The shortest cut to peace of mind is to advertise all trade-marks, new and old, at once in conjunction with the goods. Make the brands known so that others shall know. A trade-mark or brand can be made practically trouble-proof, if it is valid, by efficient advertising in the trade press.

Solving the Food Problem for the Employee.

BY G. D. CRAIN, JR.

While the war has brought it into the immediate foreground, and given it an importance not hitherto officially accorded it, the food question has for several years been one of pressing importance to employees of industrial plants. Operators of textile mills have appreciated it, and have been studying it carefully.

Food is fuel. The well-nourished worker can do more and better work by reason of the good quality and high nutritive value of the food which he eats. On the contrary, the employee whose fuel supply, to continue the figure, is scanty and of poor quality, is not able to develop the greatest degree of efficiency, any more than a boiler which is given low grade and insufficient fuel can develop its rated horsepower.

This is a self-evident fact. Its application to industry has resulted from the growing realization on the part of manufacturers that the cost of living has been climbing too rapidly for their employees to keep up with it. Increased wages have been provided almost universally, but the rapidity with which food prices have climbed has made it next to impossible for these wage increases to keep pace with food costs. Thus, it will be agreed, the worker has had a harder time than formerly in supplying his needs and those of his family even with the increased earnings which he has been able to produce.

But mill owners are helping to meet this problem in a practical way. There are two general divisions along which the proposition is being worked out, and both of them are interesting and full of important possibilities. One is the mill lunch-room and the other is the company store, or sometimes the cooperative store.

The writer was recently in one of the largest mills in the country, where several hundred employees, men, women and girls, are on the pay-roll. This company, it was noticed, operates both a lunch-room and a store, and both features are taken advantage of by practically all of the employees. There is no coercion of any kind, of course, as the feature is supplied for the benefit of the workers, and those who do not care to take advantage of it do not

need to do so. But it is a big, popular feature, and is regarded by the help as one of the best things the company has ever done for them.

The mill buys the food products at wholesale prices, and gives its hands the benefit of these figures. It costs a lot of money to retail, and the consumer of course pays this cost. The average grocer requires at least 15 per cent to cover his overhead, and if he allows 10 per cent profit, he must have a gross margin of 25 per cent of the selling price. In other words, 25 cents out of every dollar paid for food represents the necessary cost of doing business and profit of the retailer. This the company saves to the employee, who is thus able to get all of his staples at a big saving through the purchasing capacity of his employer.

It is not usually considered practicable to attempt to carry all of the regular grocery stocks in a company store. Fresh meats and vegetables, for instance, cannot be handled to advantage. But lard, sugar, coffee, canned goods, flour and all of the other necessaries of life are handled, and are sold to the workers at a figure which enables their dollars to go much further. They have to handle their own deliveries and the company does not have to figure such items as delivery and collection expense, which is one of the reasons why it is able to turn the products over to its employees at such a big reduction in price.

The company store handles its business just like any other store. It announces prices—in the plant referred to a bulletin board is kept filled with current announcements regarding price changes. Orders are taken and goods delivered as wanted, and the price charged to the "customer's" account. This amount is deducted from the pay of the employee, so that it is not necessary for him to use money in dealing with the store.

Operated in this way, a company store is an unquestioned advantage to the employee. It is very far from the old-fashioned store operated by the commissary department of the isolated industry, which endeavored to make money on the sale of food and other supplies to its hands. They were often paid in "script," which was available for use only at the company store. Such a plan is now illegal in most states, and no employee can be compelled to patronize it exclusively.

As indicated, however, the new type of store, located right in the mill, is there for the service of the employees, and no one has to patronize it. But the fact that it is putting the buying facilities of the company at the disposal of the employee and giving them an opportunity to buy their food at greatly reduced prices makes it logical that they should want to get all of their supplies from it. And that is the way it works out.

The mill lunch-room is an even better proposition, because it has an immediate and direct effect on the health of the workers. One of the best-known experts on industrial health work recently called attention to the "well-known dangers of the cold lunch," and told why employees in lines where the danger to health is great, such as chemical manufacturing, the manufacturers are supplying hot lunches as a means of enabling their employees to better resist disease. But in an industry like cotton manufacturing, where the employee is not exposed to such dangers, it is important that health be conserved and built up wherever possible.

In the ordinary plant the help are forced to eat their lunches wherever they can find a place to sit down. Many of them are tempted to go to nearby saloons, because they are able to get soup, coffee and other hot food, and have a comfortable place to sit while they eat. The manufacturer who puts it up to a saloonkeeper to supply facilities which he himself in the nature of things ought to provide is really neglecting an important department of his work. He may kick occasionally because some of his men indulge too freely in intoxicants, but can he legitimately object if he encourages them to make use of the facilities of the saloon as a lunch-room?

On the other hand, it is not necessary to provide an enormous amount of space for the lunch-room. In its simplest form it may consist of tables where the employees can eat, with perhaps a soup kettle, from which at least one item in their fare may be served hot. A well-known manufacturer who started serving soup during the winter months found that his help were greatly stimulated by this plan, and he kept it up, helping out during the summer by adding such things as ice cream.

When soup is made on a large scale, it can be produced inexpensively, especially when the mill is offering it at cost, and not adding anything for profit or handling expense. Thus the millman who makes a point of furnishing food of this sort to his workers is able to give them the advantage of wholesome and nutritive fare, at a price a good deal less than they would have to pay for it outside.

Many of the mill lunch-rooms have been enlarged in scope so as to furnish complete meals to the workers. It is not necessary for the hand in such a mill to bring a lunch from home unless he wants to, as he can get what he needs more cheaply at the mill than it could be prepared at home. He thus has the advantage of a warm and comfortable place to eat, hot food and the companionship of his fellow-employees, so that his lunch can be had under the best possible conditions.

The mill in the small town, where the homes of the workers are nearby, may not need a lunch-room, because of the ease with which its employees can go home to their mid-day meals. However, the writer has seen mills where employees who are able to leave their tasks patronize it all day long, indicating that its service need not be restricted to the single hour at noon. And as long as the work is going through, why should the hand not be permitted to eat at other times, if he wants to?

The writer recently visited a large mill where the manufacturer had decided to establish a lunch-room. He didn't have room in the plant proper, and finally decided to put the equipment on the roof. He did so, and equipped the lunch-room with a kitchen, long tables, etc., and now regards it as one of the best features of his plant. His workers are greatly pleased with the change, and those of them who are unable to get home to lunch use the facilities of this room. The difference in the "pep" with which the employees tackle the afternoon's work is very noticeable and it is easy to explain on physical grounds. The sense of satisfaction and well-being produced by the enjoyment of a good, hot meal is certainly a good basis for energetic work, while the man who has had to be content with a cold lunch, eaten in the lee of the machinery, and without proper facilities of any kind, is not always able to feel that his digestion has been properly considered.

The ease with which a plan of this kind can be started

inasmuch as moderate equipment can be added to if the results are worth while, suggests some study of the proposition from the standpoint of the manufacturer. In view of the number of girls and boys employed in cotton mills, the matter of health service is important, and these young people, as well as the older ones, will benefit especially from lunch-room facilities. The employer will be able to provide them on a basis which will give him an adequate return in money and good-will.

The food problem is one which should be solved not only in the home, but in the mill.

Acceptance Completes the Contract.

BY RALPH H. BUTZ.

There are many instances where disputes have arisen between a seller and a buyer because the seller wanted to withdraw an offer after it had been accepted by the buyer. In the majority of cases of this nature the acceptance is transmitted through the mails, and the seller has not received the letter of acceptance at the time he wants to call off the offer. Under such a condition he is of the opinion that as long as the acceptance has not been received by him he is at liberty to withdraw his offer. In fact, there are very many business men who are of this opinion, and when such is the case it merely proves that they are not well informed concerning these points in the law of contracts. For this reason it will be interesting to business men and will no doubt amply repay them to read what the law is on such points.

When a seller makes an offer by letter and it is understood that the buyer is to accept the offer by letter, then the buyer's acceptance is binding upon the seller as soon as such letter of acceptance has been posted in the mail, even though the seller claims to have withdrawn the offer before the acceptance reaches him.

The principle stated can best be illustrated by a case in point. Bradley wrote a letter to Strafford, making an offer of material at a certain price, with the understanding that the offer was to be accepted within one week from the date it was made. Strafford mailed his letter of acceptance on the sixth day following the date of the offer. Bradley did not receive this letter until four days later, and then he claimed that there was no contract because he had not received the acceptance in the time specified. The court held that the acceptance was binding upon Bradley, because Strafford had accepted within the time mentioned in the offer. The contract arose from the time the acceptance was posted in the mail.

If, as Bradley claimed, he meant that the acceptance would have to be in his hands within seven days, then he should have stated this in making the offer. If he had done this he would have been amply protected. Instead of writing that the offer would have to be accepted within seven days, he should have written that the acceptance would have to be in his hands within that time, and then Strafford would not have had any cause for action against Bradley, for it would have been plain that the acceptance had not been in accordance with the terms of the offer.

After an offer is properly accepted the seller cannot call it off without being liable for breach of contract. The contract is then completed and it cannot be cancelled unless both parties give their consent. If the seller does not want to be liable he must withdraw the offer before it is accepted, and give notice to the buyer of such withdrawal. An offer is not cancelled until the buyer receives the notice of this effect. Thus if the seller decided to withdraw his offer and writes to the buyer that the offer is withdrawn, such a withdrawal is not effective until the buyer receives the letter. Even though the seller mails his withdrawal before the buyer posts his acceptance, the seller is still bound to fulfill the contract.

Jacobsen wrote a letter to Andrews in which was the following offer: "I will sell you ten gallons of White Cross liquid at ten dollars a gallon, but at this price I must have your acceptance by return of mail." Andrews wrote and posted his acceptance immediately upon receipt of the letter containing this offer. Several hours later he received a telegram from Jacobsen, which read: "Offer for White Cross liquid withdrawn." In this case it was plain that Jacobsen could not escape liability because Andrews had accepted the offer before he received notice of its withdrawal.

When the condition, "by return of mail," is made in an offer, it is usually construed as meaning, not the very next mail, but on the same day. However, in the case just stated, it was Andrews' prompt acceptance that completed the contract. If he had waited until later in the day he would have had the telegram, and after that his acceptance would not have been valid and enforceable.

In making an offer which should be accepted within a short time it is always advisable to state the conditions plainly, so that there will be no mistake in their interpretation. If a seller makes an offer, which is to be accepted within two days, he will protect himself by stating that the acceptance must be received by him prior to a certain time. If he merely states that the offer must be accepted within two days, and the buyer does post his acceptance within this time, but the letter is lost and never reaches the seller, it may still be possible for the buyer to claim breach of contract because the seller does not fulfill his part of the contract.

Occasionally it is necessary to determine where a contract arises, since the laws of various states differ, and the enforcement of the contract depends upon the laws in the state where the contract arose. The established rule in such cases is that the contract arises at the place where the offer is accepted. If a Philadelphia seller makes an offer to an Omaha buyer, and the acceptance is posted at the latter place, then the contract is completed at Omaha, and the laws of Nebraska must be relied upon if any difficulties arise in the enforcement of the contract. The reason for this rule is that the acceptance is necessary to complete the contract, and at the place where the contract is completed there the ontract arises. This rule holds good when acceptances are made by letter, telegram or telephone. When the parties are dealing face to face, the place where they are at the time the agreement is made is the place where the contract arises.

(Copyright, 1917, Ralph H. Butz.)

The man who doesn't mix kindness with business leaves out one of the first ingredients.

The man who has nothing to lose is the one who delights in making other people take chances.

Mill Conditions and Market Reviews.

What the Southern Mills Are Doing.

An important transaction to cotton mill circles was consummated on November 17th, at Greenwood, S. C., in the transfer by President A. F. McKissick of Ninety-Six Cotton Mill of his holdings in the mill to J. P. Abney, cashier of the Bank of Greenwood. The amount involved is approximately three quarters of a million dollars.

In the sale of this stock President McKissick made an agreement according to which each stockholder in the Ninety Six Cotton Mill has the opportunity to sell his stock at exactly the same price per share as was received by himself. This action has been most favorably commented on by stockholders and outsiders as well.

At a meeting of the board of directors of Ninety Six Mill the following resolutions were unanimously adopted:

"Resolved that the directors of Ninety Six Cotton Mill have considered in detail the contract between J. P. Abney and A. F. McKissick in reference to the sale of the stock of this company and approve the same.

"Resolved, that the directors of this corporation regret that Mr. McKissick finds it desirable to sever his connection with the company.

"Resolved, that the board commends and thanks Mr. McKissick for his consideration in providing that each stockholder shall be placed on the same basis as himself in the sale of the corporation stock and in conclusion wish to express to Mr. McKissick their appreciation of his splendid management of the property and scrupulous regard at all times of the rights of the stockholders:

"Resolved, that a certified copy of the resolutions be mailed by the secretary of the company to Mr. A. F. McKissick."

Mr. McKissick will rteire from the presidency of the mill on January 3, 1918. In the fourteen years he has managed the property, he has made a phenomenal success. Mr. Abney will continue as cashier of the Bank of Greenwood. He is a young man of unusual business ability.

H. C. Couch, president of Arkansas Light & Power Co., Pine Bluff, Ark., D. B. Niven, vice-president of Citizens' Bank; E. B. Bloom, secretary of Chamber of Commerce, and associates, will organize a company to build a cotton mill. The capital will be $100,000.

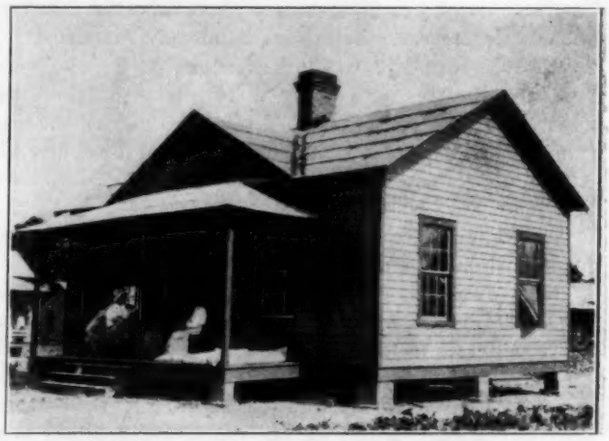
Liberty Cotton Mill at Dallas, Ga., recently organized, with following officers: R. L. Adams, Atlanta, Ga., president; H. L. Turner, Dallas, secretary; A. W. Stubbs, Dallas, manager; this succeeds the Paulding County Cotton Manufacturing Co., operating a plant with 7,400 spindles and 30 cards.

An installation of 5000 additional spindles with accompanying machinery has been decided upon by the Beverly Cotton Mill, M. B. Pitts, owner, Middleton, Ga. This new machinery has been ordered, and general mill village improvements will be undertaken, including the construction of 20 cottages for the operatives.

It is reported that a new company to be known as The Noble-McNamara Co. is to be formed to take over the Noble-Beverage Company, dyers and finishers of piece goods at Cedartown, Ga. A photograph of this plant was published in these columns only a short time ago. The officers of the company, it is understood, will be unchanged, Fred D. Noble being president and treasurer; Harry C. McNamara, secretary; and P. J. McNamara, vice president and general manager. This plant has a capacity of 75,000 yards daily and makes a specialty of waterproof and mildew proof khaki and olive drab ducks and drills.

THE LIBRARY BUILDING AT THE NECRONSETT MILLS, CUMBERLAND, N. C.

The Barker Cotton Mills at Mobile, Ala., is to be considerably enlarged in the near future, new machinery costing something like $8,000 being added. This machinery has already been contracted for, the equipment being made necessary for the large Government orders being handled by this corporation.



A COTTAGE AT NECRONSETT MILLS. NOTE THE FIRE RESISTING ROOF.

The Rex Spinning Company, Gastonia, N. C., have recently completed their new addition 150 x 130 feet and are to add cards, combers, speeders, twisters, etc. They have also recently completed nine cottages for the operatives.

The Chatham Mfg. Co., at Elkin, N. C., has completed

its arrangements for the construction of the additional mill mentioned some time ago. The additional building will be 300 feet long by 80 feet wide and three and five stories high. It will cost approximately $200,000. Machinery for this has already been purchased.

Lockwood, Green & Company, of Boston and Atlanta are preparing plans and specifications for the new duck mill which is to be built for the Government at the Federal Penitentiary at Atlanta. This building is to be 457 feet long and 210 feet wide, one story high of reinforced concrete and brick construction. It will be erected by convict labor. When completed it will be equipped with 500 looms of a character suitable for the production of approximately 116,000 pounds each week. This machinery will be driven by electric power.

The Brown Mfg. Co., at Concord, N. C., has just completed the erection of a building 80 by 50 feet to be used as a dyehouse and slasher room. In connection with this dyehouse there has also been built a small drug room 16 by 25 feet.

The Victor plant of the Victor-Monaghan Mills at Greer, S. C., is building a gymnasium for their Y. M. C. A. building. This addition is 45 by 70 feet and will be used as a skating rink and auditorium. All the cottages in this mill village have been repainted and nine new four room cottages built. H. E. Bates, formerly of Greenville is superintendent at this plant.

At the village of the Apalache Mills of the Victor-Monaghan Company at Arlington, S. C., seven new operatives' cottages have been built and the entire village repainted and repaired. All operatives' cottages have been equipped with electric lights and street lights have also been placed in this village. These mills are at present installing twenty Whitin combers.

The Tucapau Mills, of Tucapau, S. C., are erecting a large community building. The mill is being repainted inside and some new machinery has recently been added. Among this new machinery is an 1800 horsepower Westinghouse steam turbine.

An increase of capital from $300,000 to $1,000,000 has been announced by the Muscogee Manufacturing Co., Columbus, Ga., to cover improvements already completed.

The Cleghorn Mills at Rutherfordton, N. C., who were reported recently as building a two-story addition are merely tearing down an old shed room and moving the machinery to a small brick addtion which has been erected. All supplies and equipment needed for this change have been purchased.

A new warehouse, 50 by 100 feet, is being constructed by the Alpine Cotton Mills No. 2, Morganton, N. C.

S. D. Covert of Cumberland Gap, Tenn., has purchased the Harriman (Tenn.) Woolen Mills and will undertake improvements to include the installation of 30 full-width looms. He will also remove his Cumberland Gap and Pine Bluff (Va.) woolen mills to Harriman. A Government contract to manufacture 40,000 woolen blankets has been obtained by the Harriman plant.

A new yarn mill is to be erected at Forest City, N. C., and plans for this mill and its equipment are now being formed. The company has been organized, with the following officers: E. M. Crow, president, and C. A. Crow, secretary and treasurer. It is the intention of this company to make yarns.

J. E. Latham, W. P. Biddle and Edward Latham have incorporated the Latham Mills of Greensboro, N. C., with an authorized capital of $250,000.

C. A. Ensign and associates have incorporated the Ensign Cotton Mills of Forsyth, Ga., with a capital of $300,000.

The Puritan Mills Co., recently incorporated with $600,000 capital by F. L. Williamson and associates; will take over the properties of the Aspen Cotton Mills at Fayetteville, N. C., also the Consolidated Mills Co., recently chartered, with $500,000 capital, by F. L. Williamson and associates, will organize as an adjunct of the cotton mill properties at Haw River. These cotton mill properties include the Holt-Granite Mills Co., of which Mr. Williamson is president.

The village at the Abingdon Mills at Huntsville, Ala., is nearing completion and the modern school building will be ready for service by the early weeks of 1918.

The Merrimack Mills of Huntsville, Ala., have just completed several new cottages including bungalows for their overseers and a handsome two-story residence for the superintendent.

The Lowe Manufacturing Company, at Huntsville, Ala., has under construction 23 new cottages of three and four rooms each. Each house will be painted a different shade and will be handsome, comfortable and convenient.

The Huntsville (Ala.) Cotton Mill will begin to remodel and enlarge its plant about the first of the year 1918 and expects to add 10,000 new spindles at that time.

The A. A. Shuford Mills Company, of Hickory, N. C., controlling several mills at that place, has recently cut off the night work at their mills. For some time past these mills have been operating on a double schedule.

The New England Mill Situation.

The great prosperity among cotton mills during the past year was shown in the figures of earnings submitted to stockholders at several annual mill meetings held within the past month. The last quarterly dividends of the fiscal year distributed among stockholders in 37 corporations operating 71 mills at Fall River brought the average dividend up to approximately 13 per cent for the year on a capital of $33,000,000. But in addition to these regular dividends all the mills bought Liberty Bonds and left them in the treasuries, and showed actual earnings running as high as 45 per cent in individual cases. When mills show earnings of this character it may safely be assumed that very conservative valuations have been placed upon merchandise and cotton in hand.

There has been a very material reduction in debts, a substantial addition to surplus accounts, and several stock dividends declared. Repairs and renewals have been made with a free hand. While a very conservative policy has been followed as a rule, instances were pointed out of mills undertaking renewals of an extensive character wherever they were able to secure machinery, boilers, or other equipment needed.

It has not been a one sided prosperity. Wages have been advanced five times in 19 months. A recent voluntary advance of 10 per cent was made and has not been formally accepted, as operatives want 15 per cent, and threaten to strike if it is not granted by December 3. The feeling

prevails that no strike will occur, and as many of the mills are working on government supplies that are much needed, there will probably be pressure enough brought to bear to prevent any serious labor clash at this time. One of the most significant features of the situation is seen in the fact that Fall River mills took more than $3,000,000 in the last Liberty Loan while the city (including some 40,000 operatives), brought the total up to $7,000,000.

Outside of Fall River wage advances have been persistent. In fact the last series of advances began outside of that city, in Lowell, Lawrence, and other centres. Rhode Island mills joined in the advances during the third week of November. The New Bedford fine goods mills have been feeling the prosperity less than some of the mills making coarser goods, but none of them find it necessary to pass a dividend.

The realization of 30 cent cotton has come in the past month and manufacturers are finding much less fault than they found when the 15 cent limit was touched a few years ago. In fact the margin of profit is so good, and the demand for merchandise is so persistent, that cotton cost does not count as in past years. From time to time there is a call in some circles for a commandeering of the cotton crop, and the fixing of a price on it. The wisdom of a policy of this sort with a crop controlled by this country, as silk is controlled by Japan, and jute, flax, and wool by England, is at least open to debate. From all that can be seen now this country will use very much more than half its own crop, and there is no good business reason why Japan, England, or other consuming countries should not pay handsomely for the balance, as we have to pay for the crops they control.

The help shortage is growing throughout the district but on the whole mills are doing very well in maintaining their output. The fine goods mills are curtailing production more than coarse goods mills because their product is not in good demand. The need for economy is expressing itself in lessened demands for fine and fancy cottons, particularly the fancies of a sleazy character. Many of the fine goods will become as much desired as any cloths in war times, notably poplins, soisettes, lawns, cords, etc., and all the fabrics that will give good service. There is a tendency to regard all fine goods as luxuries, but those who are most familiar with merchandising conditions say that a reaction from this opinion will be seen before many months. months.

During the past month prices were named on wide domets for the manufacturing trades for the fall season of 1918. They showed advances ranging from 60 to 75 per cent over the opening prices of a year ago. Owing to the large sales of the past year to the government, Red Cross agencies, and in other channels, the mills were unable to offer a normal output for the coming season. The consequence was that the limited offerings were sold in a short time, buyers taking plaid shade goods in a very large way, especially such shades as grays and khakis. Some of the large buyers of domets for the jobbing trades have been active in the markets picking up any spot lots available, as they figure that prices now current for spot goods will be lower than the opening prices for next year.

Cotton blankets continue in very broad demand for spot and future delivery and all napped goods mills have an abundance of work ahead of them. Some of these mills have decided to sell only on 60 days' time and to change their shipping rules to f. o. b. mill, instead of granting a freight allowance to New York. The Nashua mill goods will be sold in this way and in fact several of the gingham mills have joined the new plan. It is contended that the freight allowance has been a matter of trading competition in the past, and as freight rates are likely to be higher, and as embargoes are likely to grow more numerous, the assumption is that buyers should take the risks of freights and other shipping difficulties as they do in all the territory beyond New York.

The matter of freight tax has been much discussed and it affects New England mills less than Southern mills as they have been paying only partial freights, and that in the form of an allowance, or deduction from the bills. Whoever pays the freight will pay the war tax to the government of course, and the question of remitting this tax has been decided, so far as most New England mills are concerned, as one of no interest to them. Advices from New York say a different policy is being followed elsewhere, other mills paying the war tax as a part of the trading concession.

Print cloth markets have been exceedingly strong and active all the month. Prices are a full ½ cent a yard higher, and this advance is moderate compared with the full 1 cent a yard advance on some of the sheetings. Fall River has been able to sell its weekly output and accumulate contracts in addition. For 38½ inch 64 x 60's, 11¼ cents has been paid for spots in that market, and 11¾ cents for the wide 64's. Narrow goods, and especially odd constructions have been in feverish demand. A basis of 8¼ cents is asked for 27 inch 64 x 60's. There has been a great revival in the demand for twills, sateens, alberts, and other converters' cloths and lining specialties. Sateens have gone up in some instances as much as 3 cents a yard in a few weeks, due to the great scarcity of spots and the pressure of converters to get goods to put in work.

At Fall River additional government orders were received for hospital fabrics of many kinds, the large order of 100,000,000 yards placed early in the summer having been virtually completed. Mills in other sections have taken very large government orders for drill, twists, and special fabrics. A single order of 15,000,000 yards of khaki twills for shirtings and uniforms was placed with the Amoskeag Company, supplementing other large orders completed some time ago. A great many government orders are in hand for blankets and napped cottons, but of course the large business is on twills and drills for uniform purposes, and various sorts of cotton duck.

Bleached cottons have advanced 1 cent a yard in the interval to a basis of 18 cents for Lonsdale 4-4 goods and wide sheetings are up another 2½ cents a yard. Longcloths, nainsooks, and cambrics have been in steady demand at advancing prices. There is little to add to the story of conditions in gingham and colored goods mills of all kinds. They are simply unprecedented in the matter of volume of demand and height of price levels. A staple gingham has sold at 16 cents a yard, and a 9 ounce blue denim at 50 cents a yard. More need hardly be said than to indicate prices of this character.

The large corporation printers are very busy. The strike of printers at the American Printing Company that

went on for several weeks has been broken and all machines are now being operated as usual. This works is busy on large government contracts for dyed cloths for waterproofing for army use. The Algonquin Printing Company is manufacturing nearly half its output for export. The Pacific has had a large trade on cretonnes, percales, and other cloths, its fine dress goods business being large for spring. The Arnold has been running to full capacity and the bleachers are busy as limited labor supplies will permit. The fine job printing business has been quiet but is now showing steady improvement.

It is difficult to see how the large machinery plants can hope to take care of the business offered to them at home and abroad. Wherever any part of their works may be made available for government purposes, there is no question of applying it for government first. But many government needs have been in the direction of urgent calls for additional textile machinery for special purposes and civilian business has been set aside ruthlessly. This condition bids fair to continue for some time to come. If a mill can make duck wanted by the government by altering some part of its present equipment, the work is undertaken by a mill machine shop at once without regard to previous orders, if they conflict in any way with what the government seeks.

There has been a great draft of mechanics from the shops to go into ammunition factories and ship building concerns, but a check has been placed on some of these changes by the pressure upon various works to get out goods needed by the government quite as much as other things. That the mill machinery concerns have great demands ahead of them everybody admits, but new mill construction will not be undertaken unless it makes first for winning the war.

The Yarn Market.

The yarn market for the past month has been almost a repetition of the previous month. There has been no recession in the prices of yarns and buying for Government orders seems to be the mainstay, inasmuch as Government orders constitute the larger part of the business being done by many manufacturers. Transportation facilities are also causing considerable difficulty, particularly in the transportation of Southern yarns to the market.

Early in the month many yarn buyers held to the belief that there would be a recession in raw cotton prices which would be followed by a recession in yarns. However, as the month wore on, the raw cotton market fluctuated only slightly up and down, with what seemed to be a gradual tendency to slightly increase toward the latter end of the month. There were many predictions as to what might happen if—but there was always an "if" attached to such predictions and therefore they were really of little value and in most cases the "ifs" didn't materialize. The situation in carded yarns on cones early in the month was rather unusual. Coarse numbers were weak in comparison with the medium and fine numbers. Weaving yarns were moving slowly owing to the strike of weavers and the lack of civilian business.

Spinners' prices on combed yarns showed a decided upward tendency for both Eastern and Southern yarns. Some of the sales reported were Southern frame spun 10's to 14's on cones which was on the basis of 57 and 58 cents for 10's.

Many still believe the cotton market is unnecessarily high and this belief is based upon the reports of travelers who state that in certain sections of the South the fields are still white with cotton that is unpicked because of the scarcity of labor. Even the present high prices for the staple being insufficient to induce labor away from manufacturing and other industries where labor is commanding a price much in excess of anything heretofore recorded.

As the month closes there is a good demand for yarn in spots, but manufacturers are not buying very much in excess of actual needs as yarns are not considered a safe investment at present prices. The delay in transportation experienced in the early part of the month continues and the situation is so bad that many yarn dealers will not sell for deliveries in the Philadelphia market on specified dates. They are perfectly willing to take contracts calling for shipments from the South on certain dates, but they will not guarantee delivery unless the yarns are to fill a Government contract. In other words, Government materials have the precedence over everything else and this results in a conjestion that it is very difficult for those working on non-governmental orders to overcome.

The demand for combed yarns continues light but spinners have not modified their ideas of values to any extent. Carded yarns on cones for future deliveries showed a demand in spots and with prices tending upward. Following are recent quotations on the Philadelphia market:

Southern Single Skeins.

4s to 8s	42½ @43	10s	43 @43½
12s	43½ @44	14s	44½ @45
16s	45 @45½	20s	46½ @47
24s	48 @48½	26s	49½ @59
30s	51 @51½		

Southern Single Warps.

8s	43 @43½	10s	44 @44½
12s	44 @44½	14s	45 @45½
16s	45½ @46	20s	47½ @48
26s	52 @53	30s	64 @65
40s	67 @68		

Carpet and Upholstery Yarns in Skeins.

8-3 slack	43 @43½	9-4 slack	43½ @44
8-3-4 hard twist	41 @42		

Southern Two-Ply Skeins.

8s	42 @43	10s	44 @44½
12s	45 @45½	14s	45½ @46
16s	46½ @47	20s	47 @47½
24s	49½ @50	30s	50½ @57
36s	56 @57	40s	64 @65
50s	90 @93	60s	97 @$1.05

Southern Two-Ply Warps.

8s	43½ @44	10s	44½ @45
12s	48 @48½	14s	46½ @47
16s	47 @47½	20s	48½ @49
24s	50 @51	26s	51 @52
30s	51½ @52½	40s	66 @67
50s	90 @95		

Northern Two-Ply Carded Peeler Skeins.

20s	51 @52	24s	55 @56
26s	55 @56	36s	68 @69
40s	70 @71	50s	95 @96

Two-Ply Combed Peeler Skeins.

20s	67 @68	24s	70 @71
30s	76 @77	40s	85 @86
50s	95 @98	60s	$1.05@$1.10
70s	$1.20@$1.25	80s	$1.35@$1.40

Southern Frame Spun Carded Yarn on Cones.

8s	44½ @45	10s	45 @46
12s	46 @46½	14s	46½ @47
16s	48 @48½	18s	48½ @49
20s	49½ @50	24s	52½ @53½
26s	54 @56	30s	57 @58
40s	67 @68	30s tying in	55 @56

Northern Mule Spun Carded Yarn on Cones.

10s	48 @48½	12s	48½ @49
14s	49 @49½	16s	49½ @50
18s	50½ @51	20s	52 @53
24s	56 @57	26s	58 @59
30s	61 @62	40s	70 @72

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	61 @62	12s	62 @63
14s	63 @64	16s	64 @65
18s	65 @66	20s	67 @68
22s	67 @68	26s	69 @70
30s	75 @76	36s	80 @81
40s	84 @85		

Cotton Comment.

BY H. AND B. BEER.

New Orleans, November 17th, 1917.

Strong as the position of cotton appeared one month ago, the outlook for the future is even stronger. Of late there has occurred a further big advance in the price of the staple owing to the severe cold weather of the last half of October.

The damaging low temperatures experienced east of the Mississippi river during the last half of October inflicted serious damage to late cotton in the northern half of the eastern portion of the cotton region. As a whole it is estimated that a further reduction in the size of the crop of about 1,000,000 bales has resulted from the killing frosts and freezing temperatures last month.

At the moment private estimates as to the probable size of this year's production average 12,000,000 bales including linters vs. about 13,000,000 before the cold weather materialized, whereas minimum estimates for the season's consumption by the world is about 13,000,000 bales of American cotton.

Compared with last year American mill stocks at the close of October were only 1,086,000 bales vs. 1,772,000, and stocks in public storage were only 3,030,000 compared with 3,668,000. In other words, the available, visible and invisible, on October 31st in the United States was 1,274,000 bales less than on even date last year—4,116,000 vs. 5,390,000.

Awakening to a full realization of the acuteness of the situation from the probable supply and demand point of view, Southern and New England trade interests (cotton mills) have been buying extensively of spring and summer positions in order to provide for their future requirements, and the recent big discounts compared with spot values is being gradually reduced.

Reports from the goods markets are very bullish. The civilian demand is improving for domestic and export requirements, large government orders are being filled, and because of the scarcity of burlap, bag manufacturers have bought largely of the heavy makes, and more canvas shoes are being made as a result of the shortage of leather.

While the market in the future is likely to back and fill, it would seem as if higher prices eventually are inevitable.

	This season	Last season
World's visible and invisible of American, July 31	2,525,000	3,635,000
Estimated crop, including linters, etc.	12,000,000	12,937,000
Total indicated supply for the season	14,525,000	16,572,000
Estimated world's consumption of American	13,000,000	14,047,000
Estimated available at the close of the season, July 31	1,525,000	2,525,000

The position of cotton, therefore, was never so strong since the closing days of the civil war. To give an idea of the situation, based upon current average estimates for this year's crop and this season's probable consumption, we tabulate herein deductions of interest:

As will be seen by these comparatives the supply carried over from last season was not large enough to prevent spot cotton in New Orleans from selling at 26 cents last summer. Therefore, in view of the possibility of the carry over at the close of this season next July being about 1,000,000 bales smaller than was carried over at the close of last season, it is not surprising to learn that Southern spot owners are holding in anticipation of higher prices, perhaps much higher, during the last half of the season.

According to the Census Bureau the consumption of cotton by American mills during October was of record breaking proportions, which is remarkable considering the high prices prevailing for the raw material, and the claim of shortage of fuel and labor.

Returns show that 695,000 bales were consumed in the United States last month, including 100,000 bales of linters, vs. 618,000 for the corresponding month last year, including 67,000 bales of linters. Including 268,000 bales of linters, consumption in the United States for the first three months of the season total 1,956,000 bales, against 1,838,000 for the corresponding time one year ago, during which period 201,000 bales of linters were used.

Lancashire Notes.

BY AN ENGLISH CORRESPONDENT.

Since last I wrote, the Cotton Control Board has made a very important order touching dealing in raw cotton. It involves the fixing of prices and the limiting of profits, and works in the following way: An American Official Value Committee and an Egyptian Official Value Committee have been appointed from among the members of the Liverpool Cotton Association. These committees take the spot prices ruling in the Southern States of America and at Alexandria, for American and Egyptian cotton respectively, as the basis of prices, or "official value". To this they add the approximate cost of transportation, insurance, warehousing and a certain amount of profit. At more than 5 per cent above the sum so reached no person may buy or sell raw cotton, unless the seller can prove to the satisfaction of the Committee concerned that the total cost to him of the cotton he proposes to sell is in excess of 5 per cent above the "official value". It will be seen that these regulations effectively check artificial rises in prices as a result of the scarcity of cotton, and at the same time, the daily fixing of "official values", ensures that the importation of cotton shall be profitable.

The prices at which cotton may be sold are not fixed absolutely as within 5 per cent over the "official value," prices may fluctuate according to local influences. In fix-

ing the amount to be added to the spot price, freight, insurance, and warehousing, the Valuation Committees have instructions not to exceed 25 points in the case of American and 75 points in the case of Egyptian. The more important paragraphs of the order—which affects only dealings in actual raw cotton and not business in futures—are as follows:

"The spot prices ruling in the Southern States of America in the case of American cotton, in Alexandria in the case of Egyptian cotton, and similarly in the country of origin in other cases, if any, shall be taken as the basis of official value, and to this shall be added the approximate cost of transportation, insurance, placing in warehouse in Liverpool, and such profit and other charge, if any, as the Board of Trade may from time to time allow.

"No person shall offer or receive for raw cotton a price more than 5 per cent in excess of the official value of that cotton last fixed, unless he satisfies the appropriate committee, on application to them, ... that the cost to him of the cotton he proposes to sell, after taking into account the aforesaid costs and charges allowed, exceeds the permitted five per cent of the official value, in which case the committee may allow such an increase in price as they consider reasonable in the circumstances.

"No person shall knowingly offer or receive for any growth or grade of raw cotton for which an official value has not been fixed, a price which is more than five per cent in excess of what the value of that growth or grade of cotton would be, on the day of the transaction, if determined on the same principles and in the same way as the official values hereinbefore mentioned, or more than the cotton has cost him when freight, insurance, warehousing, profit and other charges allowed in calculating the official values are added, whichever is the higher.

"Provided that, if on the application of the buyer, ... the appropriate committee are satisfied that the price at which the cotton is sold exceeds the higher of the alternative limits of price imposed above, they may reduce the price to the higher of the alternatives, and the contract shall be completed accordingly."

On October first the futures market reopened at Liverpool after having been closed since June 20th. It was closed on the latter date as a result of an instruction from the Board of Trade when prices had risen to the amazing point of nearly 1s. 8d. per pound. It was immediately following this intervention by the Board of Trade that the Cotton Control Board was set up. Although business in futures is now permitted, it is only allowed under great restricted conditions. Trading is allowed in a special emergency contract the value of which will be good middling American cotton (any growth) of good color and staple.

Trading is to take place in single months, the first month to be traded being January next and it may continue till the following May. At the expiration of each trading month trading will be allowed in the next distant month, but no further than five months ahead. Any class of order may be executed to persons who are subjects of, and residents in, the British Empire or countries allied with Great Britian, but from no other persons may orders be accepted. Trading by jobbers is permitted and settlements will take place each week, as at present. Prices on any one day may not vary more than one penny per pound from the close of the previous business day, and the maximum fluctuation on any one day must be confined to a penny a pound. The new contract is subject to the following provision:

"If by reason of the existing or any future Government interference with the production, manufacture, treatment, use, consumption, transport, storage, distribution, supply, sale, or purchase of or other dealing in cotton, or measures taken in relation to cotton or by reason of the peculiar circumstances of the cotton market brought about by the war, either party to a contract would be prejudiced by the enforcement of the actual delivery of the actual cotton, he may apply to the Committee of the Liverpool Cotton Association for permission to close the contract by invoicing the cotton back or having it invoiced back to him at a price to be ascertained as follows: The difference between the official value of good middling American cotton and the spot trading value of good middling will be taken each day, and the average of the month of such difference added to or deducted from the official value on the last day of the month shall be the price at which any contracts then open shall be closed. And the committee, if of the opinion that the applicant will suffer prejudice as aforesaid, shall grant the premission, and the contract shall be closed accordingly.

Similar regulations have been imposed in regard to Egyptian futures, with the difference that the maximum fluctuation on any one day is fixed at three-halfpence. It must be added that when a party to an application for permission to close a contract is a member of the Manchester Cotton Association, a member of that association must sit with the committee of the Liverpool Cotton Association which adjudicates on the matter.

As a whole, the control scheme has worked smoothly. So far the fund raised by the levies on employers for working above 60 per cent of their machinery has been sufficient to pay the allowances to operatives thrown out of work. The Board has allowed the local committees a fair amount of discretion in administering the unemployment payments and this has had the effect of surmounting a number of doubtful points. The Board has, however, received one serious check as a result of a strike of spinners and piecers at Oldham, in which 70 mills were involved. A rule was laid down by the Board that before any operatives were deprived of work all machinery should be "fully and efficiently staffed."

The shortage of labor is so great that, for a long time past, much machinery has not had its full complement of workers and even of those engaged some have been very inexperienced. The Board's rule was obviously sound economically—in the broadest sense— and it was also imposed in order to minimize unemployment, and so save the operatives from hardships and prevent too large a call being made upon the fund created by the levies.

The spinners and piecers of Oldham, however, so far as many mills are concerned, had a double objection to the arrangement for restaffing the mules. It meant to many young men and youths who had recently been promoted from "big" piecing to spinning that they were put back to piecing with a consequent heavy reduction in wages. Spinners were also affected in a similar fashion. Many of them have for long been working with only one piecer, which means, of course, that the earnings of the mule have had to be divided between only two persons. When at-

(Continued on page 133.)

COTTON MANUFACTURING.

Leveling Fly Frames.

BY GEORGE S. BROWN.

Keep the fly frames level. No matter how carefully they were set up by the erectors, sooner or later they will need attention on account of settling walls or floors. A fly frame that is being operated with a hollow or humped back, or with the head-end higher or lower than the foot-end, is undergoing a severe strain and is bound to wear quickly, not to mention the extra power required to drive it. Frames that are allowed to get badly out of level and out of plumb are continually causing trouble by the steel rolls shearing at the necks, bobbin and spindle shaft couplings working loose, excessive wear in most of the bearings, binding of the carriage in the slides, etc. Therefore, if intending to overhaul the fly frames, before doing anything else, put them in line, plumb them and level them up.

There may be a scientific way to proceed with this operation, but most carders care nothing about the procedure further than how to get the job done quickly, correctly and simply by means of such tools as can be easily procured. The method given in this article calls for the use of a straight-edge of eight or ten feet in length made of 2 inch by 4 inch pine wood, with both edges true, a carpenter's 28 inch or 30 inch level (the longer the better as it gives surer readings), an 18 inch iron plumb and level to use on

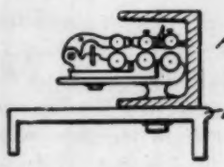


FIG. 1.

FIG 2.

sampson grooves, three angle irons, at the very least, for use on the roller beam, a couple of large pinch bars, and a supply of blocks and shingles of various thicknesses, depending upon how badly the frames are out of level.

If it is desired to do quick work, have at least four hands besides the foreman. Two men to handle the bars and two boys to put the blocks in place will make a good squad. This arrangement gives a man and boy at the front of the frame and the same at the back.

Now let us suppose that you, Mr. Reader, have selected a frame to level up. Glance along the roller beam and the flyer tops. If the frame is badly out, it may be evident to the eye which portion is the highest. If not apparent to the eye, you must use the angle irons, straight-edge and level to roughly ascertain the frame's condition. While you are doing this, have the gang remove the lag screws that hold the frame to the floor. Place a couple of angle irons on the roller beam in the position shown in Fig. 1. Put on the straight-edge and level.

If you have never done any work of this kind, you may not be familiar with angle irons. A glance at Fig. 1, will show you the general shape. These are made of cast iron with their upper and lower faces planed true and parallel to each other. These faces are broad enough (about 1¼ inch is sufficient) to permit the irons to stand erect and not easily tip over. They are constructed in their peculiar shape so that they will fit around the rolls while resting on the roller beam. A set of three is required, but a half-dozen make much quicker work. Be sure that every iron is of exactly the same height or you will get into serious difficulty.

Place one iron at one end of the frame and place a second iron the length of the straight-edge further along on the roller beam. Set the straight-edge in place and put on the level. Note which end is higher. Now move the

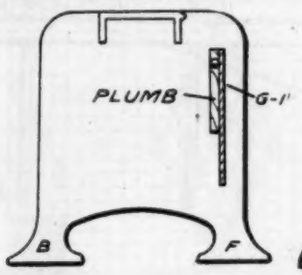


FIG. 3

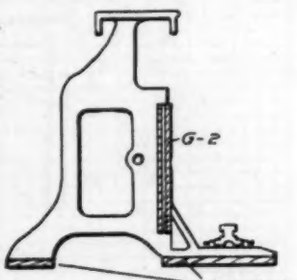


FIG. 4.

first iron beyond the second one the length of the straight-edge and put straight-edge on and try with the level. Repeat this operation until the entire length of the frame has been run over. This will give you a rough idea as to the general condition of the frame.

Now, in this case, we will say that you find the foot end which is next to the side wall of the room, to be the highest part of the frame. We will also say that the frame is badly out of level and out of plumb. In other words, you find it in about as bad shape as a frame could possibly get. Already there are some blocks under the frame, but you wish to make a clean start so you have the men remove all the blocks under the sampsons and ends.

In most cases where a frame is but slightly out in one or two places, it is not necessary to touch the blocks except at the points to be corrected, but as it is desired to make the description as complete as possible, so as to cover most requirements we will assume an extreme case.

Note if the frame is in line. This can be quickly ascertained by stretching a chalk line along the entire front edge of the roller beam. The point marked L in Fig. 1 shows the correct location. If any of the sampsons are out of line, drive them into place by tapping with the bars.

After removing the blocks from under the frame, if there is any doubt about the foot-end still being the highest point, run over the roller beam with the straight-edge and level. We will suppose that you do this and still find the foot-end the highest. This, then, is the end to work from. Why? Because this end is the highest point in the frame although resting on the bare floor. The remainder of the frame is lower. It is possible to raise the low portions to a level with the high one, but it is not

possible to lower the high portion unless the floor is cut into. This would be impracticable.

The next thing to do is to plumb the foot-end, then plumb the sampsons, and lastly the head-end.

Drop the carriage to its lowest point so as to expose sufficient length of the carriage guides to use the plumb on them. Put the plumb on the guide at the foot of the frame as shown in Fig. 3, G-1. If the foot-end leans forward, block up in front at F. If it tips backward, block up at B. Only block up one of the feet. If you have raised the back and find that you have raised it too much, don't raise the front to correct the error. Instead, put a thinner block under at the back in place of the one already there.

straight-edge and top of angle iron over sampson, X, until the straight-edge is level. Slip an angle iron in place over sampson, Y. Block up over it as you did at X but do not force the blocks under or you may raise the straight-edge and destroy the level you are trying to get.

Refer to Fig. 6. Place an angle iron over sampson V, but do not disturb the one at X because this is the correct height to level from. Put the straight-edge in place and slide the necessary blocks in place over the iron at V to raise the straight-edge to a level position. Then set an angle iron over sampson, W, and block this one up just exactly as you did at Y.

In the sketch, U is the head of the frame, so you have but to put an angle iron on the roller beam close up to the

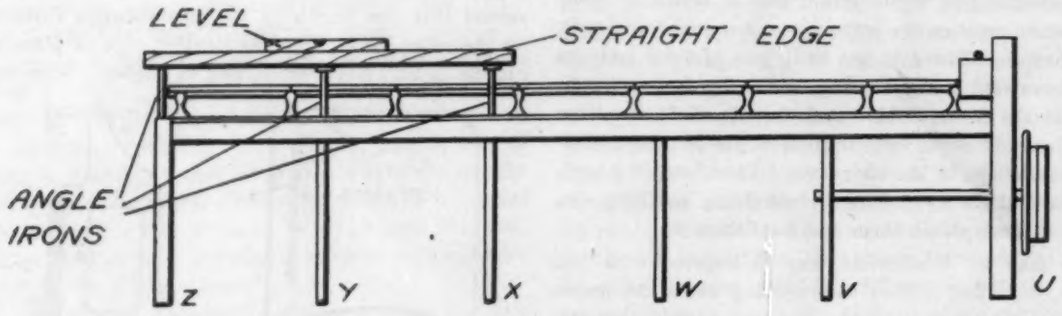


FIG. 5.

When you have succeeded in getting the foot-end plumb, then do likewise with the sampson next in order, using groove G-2, Fig. 4, to try the plumb on. Proceed the length of the frame and finally plumb the head. Only plumb in reference as to whether the sampsons tip forward or backward. Don't pay any attention to side slant; leveling the frame will correct that.

Now you have the entire frame in line and all the sampsons plumb. One operation more will complete the job. That is, leveling up. Refer to Fig. 5. Place an angle iron at the foot end, Z, and one over sampson, X. Place the

head and then slide the straight-edge along to it. Block up over this last iron. You have now been the length of the frame. If the frame happened to be a longer one, you would merely repeat the operations shown in Figs. 5 and 6 until you had run the entire length.

Let us now continue with our work. Fig. 6 shows the thickness of the blocks used with the irons: Foot-end, Z, requires nothing; sampson, Y, takes ⅛ inch; X takes ¼ inch; W takes ⅜ inch; V takes ½ inch; and U takes one inch. Raise head-end, U,—back and front together—with the pinch bars and slide a one-inch block under the front

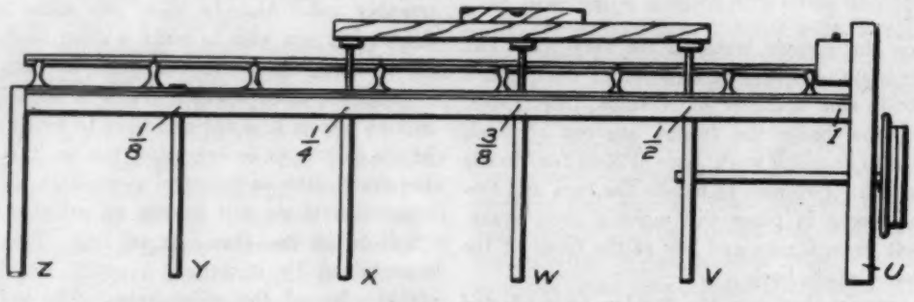


FIG 6

straight-edge on top of the irons. The length of the straight-edge governs the number of sampsons you may work on at one time. Don't put angle irons between the sampsons. The foot end, Z is the correct height as we already know and it must not be changed. Any changes must be made with other parts of the frame. As the foot-end is the highest, the balance of the frame must be raised to the same height to make it level.

Put the level on the straight-edge as shown in Fig. 5. It shows sampson, X, to be low. Slip thin blocks between

and another under the back. Be careful not to disturb any of the blocks that were used when you plumbed the frame. Under sampson, V, put ½ inch blocks; under W put ⅜ inch; under X put ¼ inch; under Y put ⅛ inch. Foot-end, Z, requires nothing.

Now, with the angle irons, straight-edge and level (but no blocks) run the length of the frame. If you have done your work carefully, the entire frame is level; every part of the roller beam is of the correct height. If you find some point out a trifle, a strip of cardboard may be suffi-

cient to correct the error. Try the plumb on the sampsons to make sure that you have not thrown them out. Stretch a line along the front edge of the roller beam to see that you haven't cramped the frame out of line. Any place out of line can be easily remedied by driving the sampsons forward or backward.

Put back the lag screws. If the old holes in the floor give trouble, plug them and make new ones, and the job is done.

Now is a good time to scour the rolls, take out the spindles and clean out the bolsters, plumb spindles, etc. After you have gotten everything back in good shape, you will find that the frame will run with much less power than it formerly required on account of the kinks removed by leveling.

A word about the blocks used for leveling will not be amiss. Have them cut the correct shape as in Fig. 4 before putting them in place so as to avoid the trouble of trimming them later. The man who does trimming after the blocks are in place, is very liable to cut the blocks and the zinc floor lining as well.

Furthermore, flat blocks are the best to use, and one block of the correct thickness is better than three or four thin ones. Some use shingles in leveling. If you do use them, drive them in place as shown in Fig. 2, using two shingles, S and S, each time. This gives a fairly level packing for the sampson feet but it is not as good as a single flat block.

Before putting in the lag screws, bore through the blocks the full diameter of the screws to prevent splitting.

Some Cotton and Mixed Cloths.

BY J. W. K.

Figures 1, 2 and 3 are fancy shirting styles, neat, effective and much desired in some markets. Dobby plans 1, 2, 3 show the methods of producing the fancy effect. Small, neat patterns not more than one inch are suitable. The particulars are:—40 dents per inch, 32's and 20's Egyptian warp, 80 picks per inch, 36's Egyptian filling. Cords are introduced upon the white ground by drawing

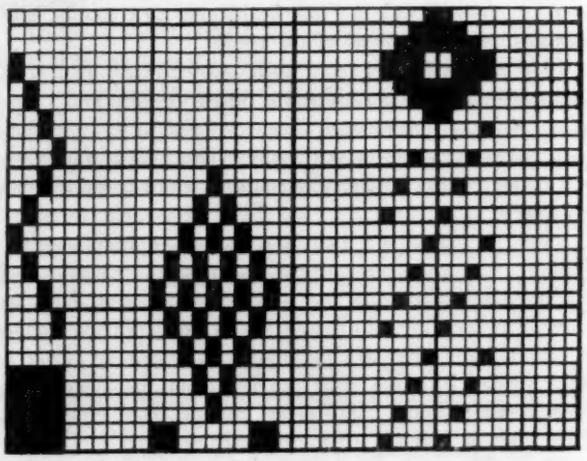
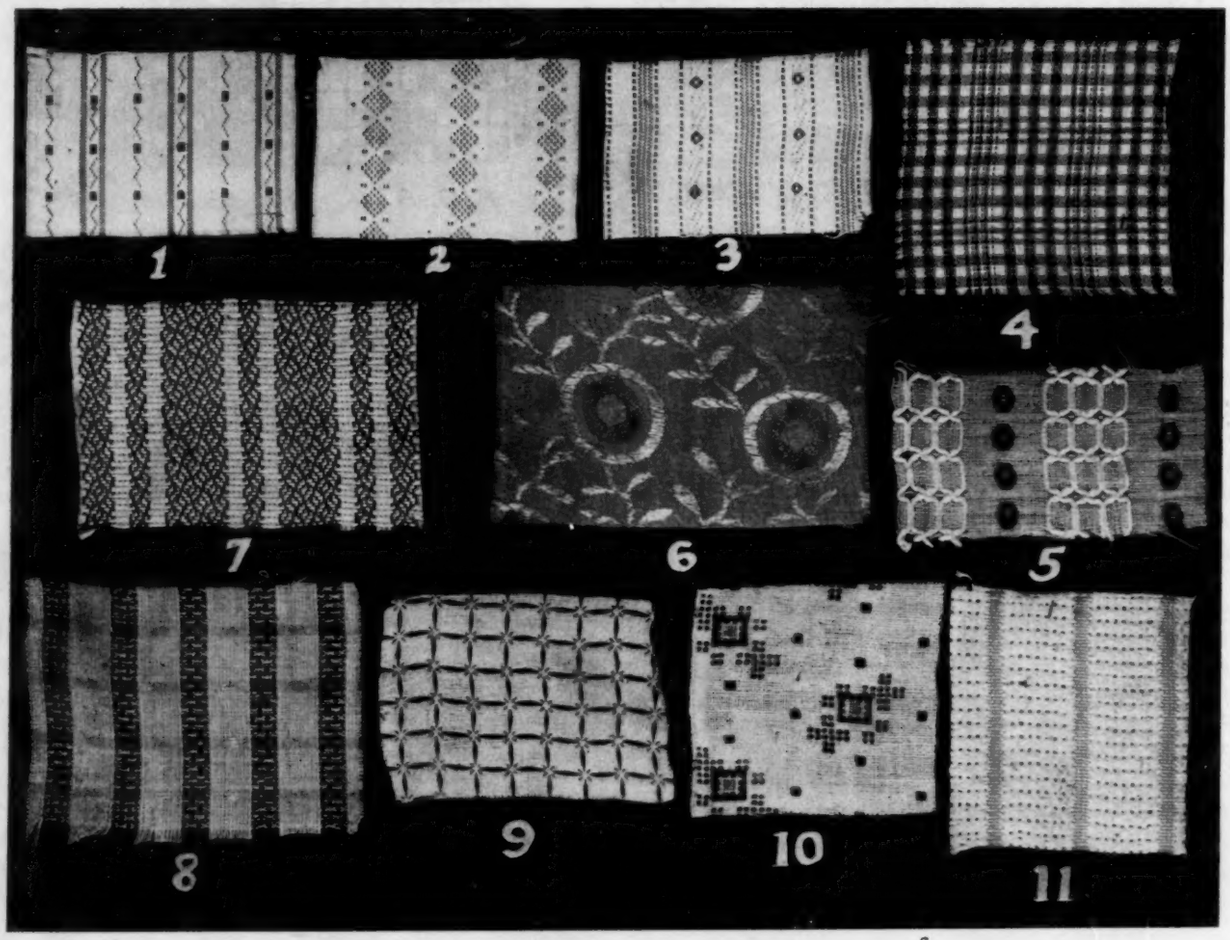
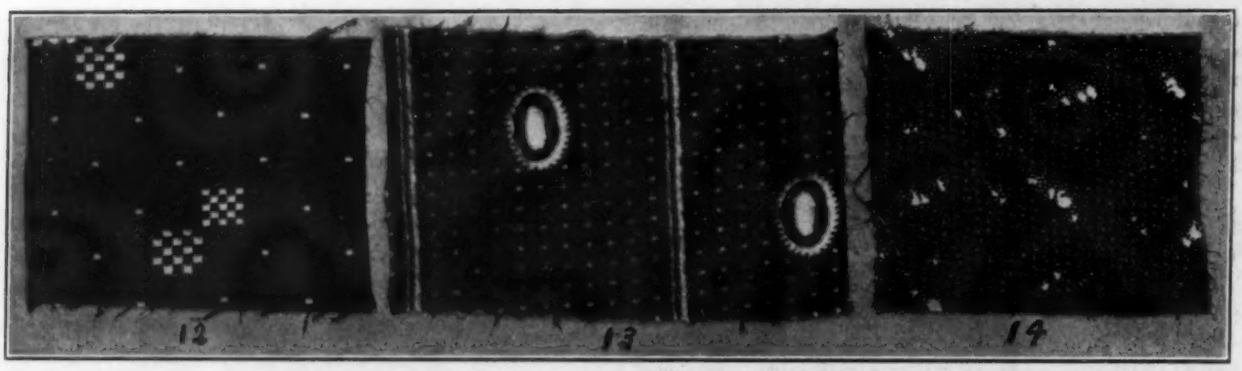


FIG. 1. FIG. 2. FIG. 3





three or more threads in one heald eye, 20's counts, and placing three in one dent of the reed.

(Fig. 4.) This is a small, neat check effect. This style being suitable in colors such as black, bright blue, sage green, cardinal, heliotrope, brown, light blue, etc. The usual makes of cambric and zephyr cloths are suitable, the idea being to have a small, well filled pattern without being too heavy.

(Fig. 5.) This is a doup and spot effect upon a muslin ground. The spot threads are crammed in the reed and the douping effect may be produced with one doup by drawing every alternate thread backwards. Various colors of ground and spot are permissible, the ground being in light shades with the spot heavier from the same color, such as white doup, light green ground, dark green spot. This must be carried out in the manner given for all patterns.

(Fig. 6.) This is a novel and striking effect and is produced by having a cotton warp and silk weft, the circles being put in by extra weft. The spots may be made of various sizes and color; the ground must have a weft figure to throw up the silk to the face of the cloth. A fine warp is required, say 60's Egyptian, 100 threads per inch, and the filling from 100 to 140 picks fine silk, according to the price desired. In some cases a fine two-fold mercerized warp is used.

(Fig. 7.) A broken effect for fancy shirtings in all colors. The particulars for this make are: 24 dents per inch, 4 threads in 1 dent, 32's warp, 40 picks per inch, 10's weft for the filling.

(Fig. 8.) This is a fancy zephyr style, these neat stripes often being desired. The weave for the colored stripe is given by dobby plan, Fig. 8, and on the white ground a spot is produced over which silk or mercerized weft is thrown in that part only, the remainder of the weft being ordinary cotton. Particulars are 36 dents per inch, 32's American warp; 18 picks per ¼ inch 40's, and 2/80's silk or mercerized cotton for the filling.

(Fig. 9.) This is a small check effect in fancy print cloth. Mercerized stripes are woven in the cloth and the print pattern is allowed to cross over these as in the figure given. Some styles have 40 threads ordinary yarn, and 40 threads mercerised yarn in the pattern, and the printing is fancy check styles. Dobby plan, Fig. 9, gives the weave for this fabric.

(Fig. 10.) A style of design for light print cloths with square effects upon a spotted ground. Various colors upon white grounds, and colored grounds with white effects are very good. The weave is plain.

(Fig. 11.) A style of shirting in which the colored stripes weave plain, and the white ground weave is as in dobby plan, Fig. 9. The particulars are: 36 dents per inch, 2 threads in 1 dent, 22's warp (American), 44 picks per inch, 10's weft for the filling.

(Fig. 12.) A style for printing on sateen cloths of medium weight for blouse and dress materials; floral and other effects upon a spotted ground are also frequently seen.

(Fig. 13.) A print flannelette suitable for blouses and underclothing. A fine warp is required with condensor weft so as to be able to get plenty of nap on the cloth during raising. The design is novel stripes and large spots upon a spotted ground. This style may be made in all colors.

(Fig. 14) is a print dress cloth, a nap being raised on the back of the cloth only. This style is an imitation of the woolen and silk mixtures so often seen. The weave is

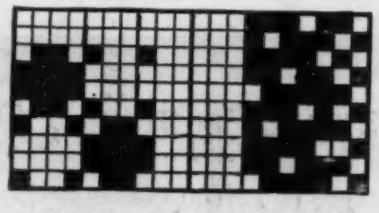


FIG. 8. FIG. 9.

2 x 2 twill and a good cloth for this style would be: 36 dents per inch, 2 threads in 1 dent, 22's American warp, 64 picks per inch, 16's weft for the filling. The cloth to be woven grey, bleached, and printed in various colors.

Specialists in Nigrosines.

Announcement has recently been made by the Radcliffe Color & Chemical Works, Inc., Grove and Williamson Sts., Elizabeth, N. J., that in compliance with the growing demand for dyestuffs of standard strength and quality they have prepared to meet the needs of the various consuming industries including the cotton textile mills.

This company are specialists in the manufacture of nigrosines and establish and hold to the highest standard for quality.

The Radcliffe Color & Chemical Works, Inc., manufacture the following nigrosine products: spirit soluble Nigrosine B, standard blue shade; spirit soluble Nigrosine BB, standard blue black; spirit soluble Nigrosine JB, standard jet black; water soluble Nigrosine B, standard blue crystals; water soluble Nigrosine JB, standard jet black crystals; oil soluble blue; oil soluble black, and Nigrosine base.

Dyeing, Bleaching and Finishing.

Finishing and Shrinking Denims and Khaki Goods and the Waterproofing of Khakis.

BY WILLIAM B. NANSON.

All denims or fibre dyed khakis should be finished. No matter how heavy the weight may be, or how close the texture these goods will have a raw look and feel if they are put up and marketed as they come from the loom without any further process of finishing.

Aside from the feel and appearance, the goods require to be finished in order to set them, i. e., to shrink them into something like a permanent condition so that the cloth will stay after wearing and washing, and not shrink out of all shape and appearance. Even heavy, closely woven goods, which require no stiffening or filling materials added to them in the finishing operations, should be at least wet out in water and dried and shrunk. Medium weights should be run through Epsom salts of various strengths to give weight and feel, and the lighter grades can be filled on the back by a machine as shown in Fig. 1.

In cases where starching has to be applied, probably the best finishing size for denims or khaki is a solution of soluble starch. When this is put into boiling water it does

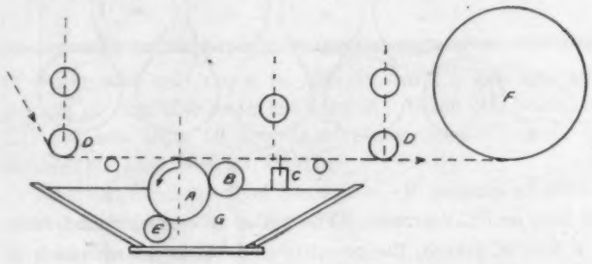


FIG 1

not thicken up as starch usually does, but dissolves completely. This solution thickens on cooling but thins down and becomes ready for use when heated up again. In this way, it is—while being used—a very thin liquid, and the fabric easily absorbs it, and it penetrates to an extent not possible with any ordinary starch jelly. Soluable starch therefore gives a fuller and more even finish and it is more especially suitable for sizeing denims or khakis than any other starch because it does not affect the color of the material. As a matter of fact it enlivens the color and improves it. Soluble starch may be made in a variety of ways, but the best and most practical method for the finisher is by the use of diastafor, which I will explain later.

Of all the other starches—potato and corn starch injure the color the least. These starches form a colorless, transparent mucilage, which dries into a film that hides the coloring matter much less than either flour or sago. Should flour size be used, whether fermented or not, it would quite change the color of most dyes.

Regarding potato starch, it might be said, that unless it is thoroughly and carefully boiled it is liable to separate itself from its water and lose its adhesiveness if allowed to stand and cool. Moreover it is difficult to achieve the same results from separate lots owing to its variable quality. From this it may be inferred that it is the opinion of the author that *corn starch* is the best starch to use in the finishing of denims.

What I should suggest is to use corn starch as the sizing medium for the adhesive agent in the mixture and to make this into soluble starch before using by the agency of diastafor.

To make starch soluble by means of Diastafor we may proceed as follows:

A homogeneous starch paste is first made by mixing the starch with cold water and then boiling, with constant stirring in the usual way. This mixture is then cooled down to 150 degrees F., and from two to three per cent of Diastafor, previously dissolved in warm water, is added. The action of the Diastafor must be discontinued as soon as the paste liquifies. This will take about half an hour. During this period it is necessary to constantly stir the mixture to secure a uniform condition of solubility throughout the batch. By raising the temperature to 180 degrees F. the liquifying action of the Diastafor can be immediately stopped.

To save time, when making large quantities of size, the steam may be turned on to the cold starch mixture as soon as the Diastafor has been stirred in, as it is only reasonable to suppose that the Diastafor will have acted its part long before the starch reaches a temperature of 180 degrees F. All the other ingredients of the mixture should also be added at this stage such as turkey red oil, Epsom salts, glucose, or whatever additions the fancy or experience of the finisher may dictate. The mixture is then thinned down to its requisite strength and applied hot. All the ingredients added in this way are held firmly by the starch and will not rub or dust off owing to the peculiar adhesiveness of dressings made from soluble starch.

Diastafor is a preparation of malt and owes its effectiveness as a solvent of starch to its great diastatic power. For the conversion of starch into a soluble form it is far superior to any other method known. It has no action on vegetable fibres and does not affect colors in any way. Being completely soluble in luke warm water it is always easily available for immediate use and therefore represents economy of time and labor and reliable and satisfactory results.

Diastafor is used where supple and closely adherent results are required and as it has a tendency to brighten instead of deadening colors it is one of the most valuable agents that can be used for the starching of denims.

Soluble starch when made into a cream with cold water and then poured into boiling water should completely dissolve and should not set when cooled. If it forms a jelly it indicates the presence of unconverted starch.

Where weight has to be added to denims, glucose or Epsom salts are indicated as the best substances to use. Glucose or grape sugar has long been used by the English finishers on high grade colored goods or where, as in the case of denims, mineral fillers or weighters are inadmissable.

It conveys a peculiar as well as a soft feel if used in the right proportion, and can be used to good advantage on some grades of denims or fibre-dyed khakis.

When used simply as a weighting agent for pure finish goods glucose is unsurpassed for giving excessive weight. It can be used along with all other finishing materials but it readily ferments and is liable to promote mildew if used by inexperienced hands. Glucose and sugar, if added to any kind of a starch mixture, increases very materially its adhesiveness.

Starch glucose is sold in several forms, varying from pure anhydrous dextrose, through inferior kinds of solid sugar to the condition of a thick syrupy liquid resembling glycerine which contains a large proportion of dextrine. The term "glucose" is restricted to the syrupy preparations, the solid products being dignified by the name of grape sugar, probably because it contains no elements of either grapes or sugar.

For denims or fibre-dyed khaki that are of fairly good quality, say 2.50 yard or heavier, Epsom salts alone may be used to give weight and feel to the goods, but it must always be remembered that soap, finishing paste, soluble oil, etc., cannot be used in mixtures containing Epsom salts. A good deal of weighting can given with Epsom salts and the finish is permanent and will not mildew. A 50-yard piece of six-ounce denim can be increased in weight six pounds; it is easy to make an 8-ounce fabric out of it without its showing. To effect this, the Epsom salt solution would have to stand at 60 degrees Tw. This mixture must be applied hot, the goods being mangled through the liquor on a two bowled mangle and dried directly over the cans. A solution standing at 40 degrees Tw. is much used in the old countries on denims and on many styles of woven colored dress goods for export. It easily penetrates the fibres of the cloth, and on drying it crystalizes, causing the fibre to expand and swell out, and therefore giving it a very full and substantial feel, moreover it has no action on the cotton fibre or any of the colors.

Glauber salts may be used in mixture with the Epsom salts to reduce the cost, or they (Glauber salts) may be used alone, but the finish is hardly so good. If the goods are dried slowly on the cans at a pressure of 10 pounds the finish is stiffer, if dried quickly, or if the pressure is lowered to, say, five pounds, the finish is softer.

There are a thousand little kinks of this kind that can not be entered into in our limited space all of which bear upon the quality of the finish. All we can do is to point out the way in a general direction. The trouble is that in most mills it is difficult to get it through the intellect of the average superintendent that the finishing department is the most important department in the mill, upon which depends the successful merchanting of the whole product of the mill and its consequent financial success or failure—more often the latter. The consequence of this has been that the finishing room is usually bossed by a man who knows nothing of finishing, or one who has learned his trade from a correspondence school, a textile college or some other local mill where the boss got his job as finisher through being second cousin to the night watchman. I would say here, that there is throughout the whole wide world no position which requires both brains and actual practical experience like that of a *boss cotton cloth finisher*, and that one may search the whole wide, wide world in vain to find a mill manager who seems to be aware of this fact.

Denims can be run *through* Epsom salts of various strengths to give weight, shrinkage and feel, but the lighter grades, where starch must be used, must be filled on the back only, on a backfilling machine as shown in Fig. 1. This machine should be attached to a cylinder drying machine in such a manner that the face or unsized side of the goods only is brought into contact with the hot cylinders, this can be done by using a special drying machine, Fig. 2, where the cloth is run over a series of hot cylinders, *A*, and wooden rolls *B*, or, by drying on a regular two-tier drying cylinder machine as in Fig. 3, with the steam shut off the first four top cylinders, *A*, *A*, *A*, *A*. Unless this is done the starch will stick to the drying cylinders as long as it remains wet and will make dirty and unsatisfactory work.

Referring to Fig. 1, the starch box *G* being filled two-thirds full of the starch, and the machine and the dryer being started, the cloth passes in the direction of the dotted line and the arrows. The roller *A* carries round with it a film of starch, the quantity and thickness of which is regulated by the press roll *B*, which can be adjusted closer or farther from the roll *A*. The cloth after passing in contact with the two rolls *A*, *B*, is drawn tightly over the metal "doctor" blade *C* which spreads the starch and filling materials on the surface of the back of the goods and also scrapes all superfluous sizing materials off. An agitator *E* is placed in the starch box to prevent the subsidence of the heavier sizing and weighting materials. *DD* are rollers which may be regulated in height to give more or less contact and consequently more size to the cloth as it passes over the rollers. The small rods shown under the cloth between *D* and *A* and *C* and *D* are to lift the cloth when necessary, entirely free from *A B*. They work with the moving parts of *D D*, and rise and lower with them. Two doctors could be used if necessary to make a cleaner job of the filling.

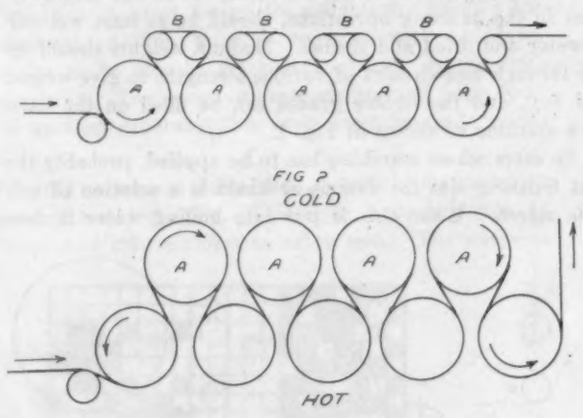


FIG. 3.

The following may be considered as good size mixing for back filling low quality denims: Make 25 pounds of corn starch into a paste in the usual way by boiling in 45 gallons of water, cool down to 150 degrees F., and add two pounds of diastafor previously dissolved in lukewarm water, keep stirring and as soon as the starch becomes thoroughly liquid add 5 pounds of soluble oil and 80 pounds of glauber salt and boil the whole up together again.

Another—boil 55 pounds of corn starch in 30 gallons

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THOMAS K. CHAFFEE CO., Providence, R. I.

of water and cool down to 150 degrees F., and add two pounds of diastafor as in the former. When the paste has liquified add 30 to 50 pounds of glucose and 5 pounds of soluble oil and boil all together.

Another, much used by the writer—40 pounds of starch treated as before, 30 pounds of Glauber salt, 30 pounds of glucose, 50 gallons of water.

I would remind the readers that the consistency of a starch depends upon the time it is boiled. The longer a starch mixture is boiled the thinner it becomes, therefore, care must be taken to always boil the same mixture the same length of time, or there will be a wide variation in the finish.

By way of recapitulation we may say that for heavy, high quality denims it is best to mangle the goods through hot water to shrink them, dry upon the cylinder driers, lay overnight to cool and condition, sprinkle twice on sprinkler, Fig. 4, lay over two hours and fold off.

For lighter, fair qualities, mangle through a hot solution of Epsom salts of various degrees of strength to suit the goods and the weight desired, dry up as before, lay overnight, sprinkle as before and fold. A nice, full, mellow finish can be got on a fairly high grade denim by running it through Epsom salts at 40 degrees Tw., and 1 per cent of chloride of zinc, and drying the goods as cool as possible.

With regards to the lower grades, they must be starched on the back by some of the mixtures and processes already given, dried with the face to the cans as described, laid overnight to cool, sprinkled once or twice, and calendered on the three bowled calender, Fig. 5, to break up any undue stiffness that may appear through the starching. In Fig. 5 the top and bottom bowls are wooden bowls lapped with blanketing, and the middle bowl is steel heated with steam. *A* is an expander and *BB* are steel doctor blades over which the goods are run to break down the stiffness. The goods are run with the back of the cloth to the doctor blades and the expander.

It must be understood that the goods are not run over

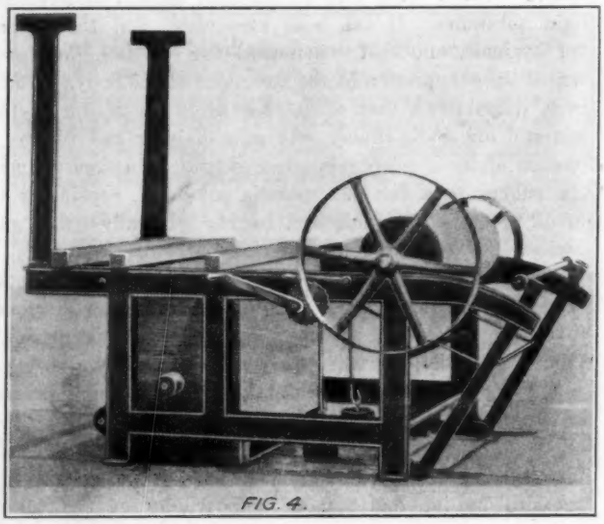

FIG. 4.

the expander to stretch them, but to smooth out the scrimps and creases and mellow the feel of the goods.

All denims and khakis should always, after starching and drying, be allowed to cool overnight and then damped on a sprinkler and rolled up for an hour or two before

folding and packing. This is to break up any undue stiffness the goods may have and, moreover, the water from the sprinkler adds very considerably to the weight.

A light breaking and calendering on a flannel covered calender, as shown, is quite necessary on some grades, but a good dampening on the sprinkler is always essential to a right finish.

The best finished piece of denim that the writer ever saw was a piece of goods weighing 2.40 yards to the pound finished by the Stakehill Finishing Works, Middleton, England. These goods were back filled with starch only and

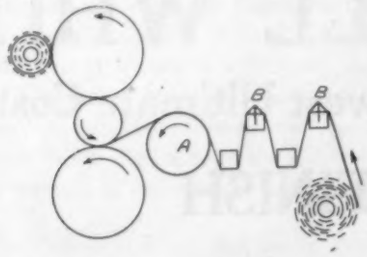

FIG 5.

dried on a single tier of cans, Fig. 2, with the *face* to the hot cylinders, they were then mangled through hot Epsom salts at 40 degrees Tw., containing about 1 per cent of chloride of zinc, dried again on the same machine, Fig. 2, but with the *back* to the cans this time so as to force up the twill, damped and rolled up twice as before described and folded up. They finished exactly 8 ounces to the yard, the twill stood up prominently, and no one could tell that they had any stiffening in them. This could not be done here, the double runs would fill the soul of the efficiency manager with holy horror. What most of our mill managers want is quantity—not quality.

WATERPROOFING KHAKIS.

We do not intend, in the present paper, to discuss the waterproofing of cotton goods by such agents as india-rubber, gutta-percha, siccative oils, paints or other such media, which owe their value by filling the threads and the spaces between them with an air-tight as well as a water-tight substance. It has been recognized that these were not hygienic, and that, when used for clothing, they prevented the evaporation of the secretions of the body. Moreover, it is known that when exposed to the action of the sun and air, india-rubber acts as a dialyzer and retains a portion of the atmospheric nitrogen, which, in time, reduces the rubber to a friable, inelastic condition, causing it to break open in the folds and become generally leaky and useless as a waterproofing material.

The waterproofing processes to which we shall more especially call the readers' attention in this paper are those involving the colloid theory. A colloid, as distinguished from a crystalloid is recognized as more usually showing a rounded outline, a homogeneous mass, with more or less toughness of texture. Now assuming the generally accepted theory of the spheroid character of water and its molecules as being indisputable, and assuming also the rounded outline and smooth homogeneity of the colloid which we should use as a waterproofing agent, it will be seen that so long as the waterproofed fabric is dry any descending water, or rain, (being itself,—physically at least—in a colloid condition) will roll over the rounded outlines of the colloid waterproofing agent in the fabric and run off without wetting it. This condition is the one known to the trade as "repellant," and is one of the conditions called for in the case of khaki drills and ducks for all government contracts. This condition, however, renders the goods in no sense waterproof, as the water can readily be forced through the cloth by pressure, or be drawn through from one side to the other by capillary attraction.

Absolute impermeability can never be attained, and does not exist, even if the fabric has shown itself water-tight for weeks or months. Therefore, the term "waterproof" may be considered as being only relative.

A fabric to be waterproofed must be woven very tightly as are army drills and ducks, and there should be no flaws in the weaving. By chemical impregnation with some colloid substance the fibers must be made to hold back the water mechanically, and the interstices between the threads should not be filled up. The goods for waterproofing must be thoroughly scoured so as to partly remove the coloring matter and all the grease and size from the fabric. Both unbleached or unscoured and also fully bleached goods do not readily take up the waterproofing mixtures, so that the goods must be boiled for 6 to 8 hours in soda, and washed and scoured and washed again. They must then be mangled through boiling water to shrink them thoroughly and dried up bone dry. They are now ready for the waterproofing. As an impregnating fluid capable of forming colloid substances within the fibers of the cloth to be waterproofed acetate of alumina possesses many advantages. It may be prepared by the waterproofer himself, by either of the three following methods:

(1) By decomposing sulphate of alumina with acetic acid in the presence of chalk.

(2) By decomposing sulphate of alumina with acetate of lead.

(3) By decomposing sulphate of alumina with acetate of lime.

Or, he can buy the acetate of alumina liquid in barrels already made. The liquor should be tested with chloride of barium to show the sulphate of alumina in slight excess, and with oxalate of ammonia. If the latter gives a precipitate, there is too much acetate of lime in the mixture and this must be remedied by adding more sulphate of alumina. It is better to have an excess of sulphate of alumina than of acetate of lime or lead. Whichever way the mixture of acetate of alumina is made, it must be allowed to settle until thoroughly clear before using, and in all cases the impregnating liquors should not be above 100 degrees F.

The following are a few of the best methods of waterproofing:—Assuming all goods to have been thoroughly scoured and rendered completely absorbent. (1) Pad the goods on a padding machine in an acetate of alumina bath at 7 degrees Tw., wind on to rolls and lay overnight without drying. In the morning run again and dry up as cool as possible. Then work them in a hot solution of pure tallow soap, using about one-half pound soap to the gallon of water. The result of this process is the formation of the colloid, stearate of alumina, on the goods. The acetate of alumina for this recipe is made from alum 10 parts, soda 9 parts, acetic acid 3½ parts, or, by any of the other usual methods. Always remember that long steeping in the alumina and as cool drying as possible are

(Continued on page 138.)

Barrett Specification Roofs
UNITED STATES FIDELITY & GUARANTY COMPANY
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LOWELL BLEACHERY, LOWELL, MASS. Covered with a Barrett Specification Roof, Planned and constructed by Robinson & Robinson, Lowell, Mass.

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We now give this bond on all roofs of fifty squares or over in all towns in the United States and Canada of 25,000 population and over, and in *smaller places where our Inspection Service is available*, the only provision being that The Barrett Specification dated May 1, 1916, shall be strictly followed.

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Notes About Men You Know.

COL. C. B. ARMSTRONG, THE WELL KNOWN MILL PRESIDENT, OF GASTONIA, N. C.

COL. ARMSTRONG, about a year ago, promoted a textile plant at Gastonia which was known as the Mutual Cotton Mills. This mill, the stock of which is owned largely by the operatives who are paying for it through a building and loan association, began operations in October of this year. The capital stock of this company is $200,000, and its officers are C. B. Armstrong, president and treasurer; B. F. S. Austin, vice-president; W. Ralph Armstrong, secretary; A. K. Winget, assistant treasurer, and Lee Smith, superintendent.

R. H. LAYTON, superintendent of the A. A. Shuford Mills, at Hickory, N. C., has resigned from this position and accepted a position with the Papco Paper Products Company, of Atlanta, Ga., traveling in central North Carolina.

M. J. HAWKINS has resigned from his position as night superintendent at the A. A. Shuford Mills at Hickory, N. C., and has accepted a position with the Papco Paper Products Company of Atlanta, Ga., with a territory located in western North Carolina. Mr. Hawkins makes headquarters at Hickory, N. C.

E. M. DEES has been promoted from the position of second hand in the card room at the Darlington (S. C.) Cotton Mills to overseer of carding at night for the Efird Manufacturing Company, at Albemarle, N. C.

W. H. DEES has been promoted from speeder fixer to second hand of the card room at the Darlington (S. C.) Manufacturing Company.

TROY WEAVER has been promoted from speeder tenter to speeder fixer at the Darlington (S. C.) Manufacturing Company.

DEAN SUTCLIFFE, formerly of Randleman, N. C., has accepted the position of superintendent of the Pomona Mills, Greensboro, N. C.

J. M. ALEXANDER has resigned as overseer of weaving at the Ware Shoals (S. C.) Mfg. Co., to accept a position as superintendent of the Courtenay Mfg. Co., Newry, S. C.

E. R. HAZEL, formerly superintendent of the Olympia Mills, Columbia, S. C., has accepted position as overseer of spinning at the Hermitage Cotton Mills, Camden, S. C.

D. R. HARRIMAN, JR., has resigned as superintendent of the Griffin (Ga.) Mfg. Co.

W. M. WALTON has resigned as superintendent of Buffalo Mill, Concord, N. C., and is now night superintendent of Alpine Mills, Morganton, N. C.

R. W. ATKINS, formerly connected with the Merrimack Mills at Huntsville, Ala., as overseer of carding, has resigned to accept a position with the Jackson Fibre Company at Bemis, Tenn.

H. H. BAKER has been promoted from overseer of spinning to superintendent of the Griffin (Ga.) Mfg. Co., succeeding D. H. Harriman, Jr., resigned.

F. L. WILSON has changed from superintendent of Avon Mills to same position at Gastonia Mfg. Co., Gastonia, N. C.

W. R. PARKER, formerly at Sylacauga, Ala., has been made night superintendent of Bibb Mill No. 1 at Porterdale, Ga.

BENJAMIN B. GOSSETT, of Anderson, S. C., president of the Riverside Manufacturing Company and Toxaway Mills, has been elected president of the Pendleton Cotton Mills, at Pendleton, S. C.

JOSEPH J. BRADLEY, AGENT OF THE MERRIMACK MFG. CO., HUNTSVILLE, ALA. MR. BRADLEY IS ALSO A POPULAR MEMBER OF THE SOUTHERN TEXTILE AND AMERICAN COTTON MANUFACTURERS' ASSOCIATIONS.

T. A. PUTNAM has resigned as superintendent of the Mills Mfg. Co., Greenville, S. C., on account of ill health and removed to his farm.

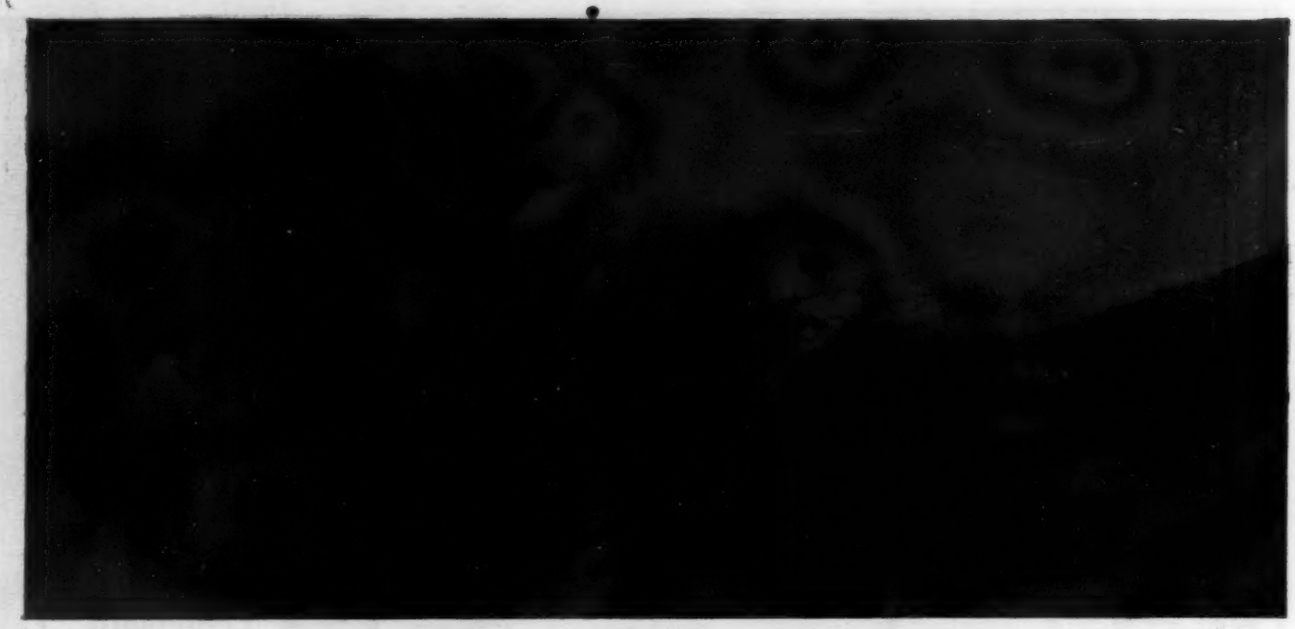
WINDER GARY, assistant superintendent at the Fulton Bag & Cotton Mills, Atlanta, has resigned and entered officers' training camp for aviators at Atlanta, Ga.

EDWARD WEINGARTNER, the president of the Arabol Manufacturing Company, of New York, and well known to the textile trade of the country, died on Friday, October 26th.

J. B. CLEARY has changed from superintendent at the Gonzales Cotton Mills, Gonzales, Texas, to night superintendent of the Magnolia Cotton Mills, Magnolia, Miss.

R. S. SCARBORO has been promoted from overseer of spinning to assistant superintendent in the Dan River Mill No. 4, at Danville, Va.

H. F. JONES has resigned as superintendent of Easley Mill No. 3, Liberty, S. C., to accept a similar postion with the Echota Cotton Mills, Calhoun, Ga.



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Fires are on the increase. Incendiaries are at work. How well protected are you?

Remember this: a little protection is dangerous. It gives a false sense of security.

If you have only 10 Pyrene extinguishers when you need 20; if you have only 50 when you need 100 you are underprotected. Your plant is unsafe.

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Zavon is the natural solvent for such foreign matter. It contains one of the most powerful solvents known, and its action on fats, oils, and waxes is almost instantaneous. **Zavon** will reduce your spot account 99% at a very slight cost. It gives a better hand and body to the goods than any other similar product in use today and the unevenness of shade to the finished dyed fabric due to improper circulation and penetration is reduced to a minimum where **Zavon** is used in the preparatory treatment.

We shall be glad to furnish a sample for trial on request.

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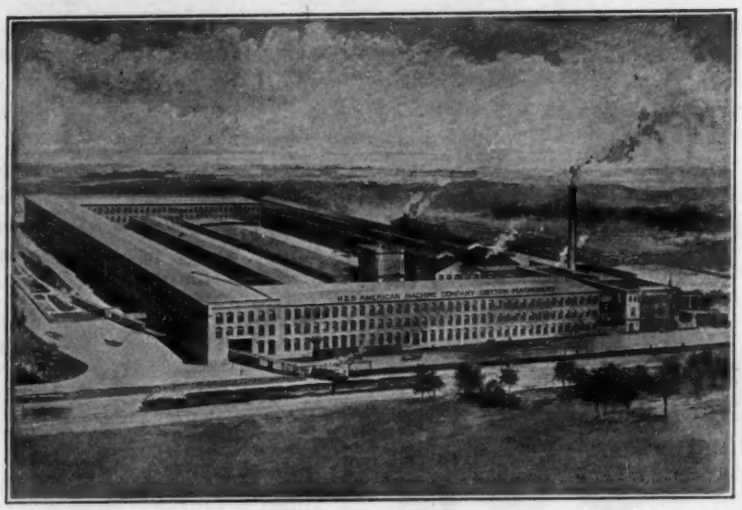
Opening and Picking Machinery

Card Room Machinery



Spinning Room Machinery

Twisters for Wet or Dry Work

With Band or Tape Drive

H. & B. AMERICAN MACHINE COMPANY
PAWTUCKET, R. I.

J. K. FONVILLE is superintendent of the Cheraw (S. C.) Cotton Mill, which will begin operations next month.

J. O. SPAKE has been promoted to superintendent of Easley Mill No. 3, Liberty, S. C.

A. L. WHETSTONE has resigned as overseer of spinning and twisting at Dixie Mills, LaGrange, Ga., to accept position as superintendent of Lawrenceville (Ga.) Yarn Mills.

THOMAS F. KELLY has been promoted to the position as superintendent of the Bowditch Dye Works, Putnam, Conn. He was formerly overseer of dyeing at this mill.

W. E. HAMMOND has been promoted from overseer of carding at the Mills Mfg. Co., Greenville, S. C., to superintendent of the same mill.

L. W. CUDDY has accepted position as superintendent of Enterprise Mills, Augusta, Ga.

DANIEL SCHOFIELD has been appointed superintendent of the Gambrill Mills, Nos. 1 and 2, of Bessemer City.

H. W. WARNER, superintendent of the Ivey Mill at Hickory has been appointed superintendent of the A. A. Shuford Mills and Highland Cordage Co., also.

H. GARDNER MCKERROW, for the last two years associated with the Marden, Orth & Hastings Corporation in the establishment and management of the Textile Department, has severed his connection with that concern and is now associated in a similar capacity with E. F. Drew & Co., Inc., 50 Broad Street, New York City.

Mr. McKerrow will have the management of the Textile Department and it is proposed to go into the handling of dyestuffs as well as the mill chemicals and industrial oils, with which the name of E. F. Drew & Co., Inc., is already associated and well known. Special attention will be given to American dyestuffs and it is the intention of the department only to handle those colors which can be offered as being of type, strength and quality.

Mr. McKerrow has been identified with the development of the American dyestuff industry through many channels, and is now the instigator of a movement which it is expected will result in the convention to be held in New York City in January next, at which it is hoped all the manufacturers of American dyestuffs will be represented, for the consideration of a proper means of standardizing American colors. Mr. McKerrow will have associated with him, T. F. O'Keeffe, formerly his assistant at Marden, Orth & Hastings Corporation, and who is also well known to the dealers and manufacturers of dyestuffs in this country.

P. A. SMITH has resigned as spinner at Fulton Bag & Cotton Mills, Atlanta, and accepted position as superintendent of the Selma (Ala.) Mfg. Co.

E. L. THOMPSON has resigned as superintendent at Burlington, N. C., and moved to Haw River, N. C.

B. L. LELWELL has accepted position as superintendent of the Harden Mfg. Co., Worth, N. C.

W. R. YOUNG has been promoted to overseer of carding in the Brandon Mill at Greenville, S. C., where he had served for eight years as second hand under W. F. Davis, who has recently been promoted to superintendent.

G. W. Starnes, formerly overseer of weaving at Lexington, S. C., and for the past year with the Lancaster Mills, has accepted position as overseer of weaving in the Southside Mills, Winston-Salem, N. C.

N. B. DAVIS has been promoted from overseer of spinning at Clara Mfg. Co., to superintendent of Armstrong Mills, Gastonia, N. C.

W. B. VARNADORE, formerly of the Eureka Mill, Chester, S. C., has become overseer of carding at the Pickett Cotton Mill, High Point, N. C.

J. H. LYTLE has accepted position as overseer of spinning and winding in day time, with the Dixie Cotton Mill Co., Mooresville, N. C.

R. L. ROBBINS has been promoted from second hand to carder for the Fairmont Mfg. Co., Fairmont, S. C.

E. W. SPRADLEY, formerly overseer of spinning, Dixie Mill, Mooresville, changes to a similar position with the Highland Cotton Mill, High Point, N. C.

B. M. EVERETT has returned to his former position as overseer of spinning at night at the Anchor Duck Mills, Rome, Ga.

H. W. STORY has resigned as overseer of spinning at the Hermitage Cotton Mills, Camden, S. C.

LEFT TO RIGHT: JOHN POTTER OF THE ATLANTA OFFICE OF THE AMERICAN MOISTENING CO, AND SUPERINTENDENT C. E. PEARCE OF THE TALLAPOOSA (GA.) MILLS.

CHARLES WARD of Groves Mill has accepted the position of carder at Clara Mfg. Co., Gastonia, N. C.

A. G. PITTMAN has accepted position as overseer of spinning at the Victory Mfg. Co., Fayetteville, N. C.

O. H. DUNN has resignd as overseer of carding at the Central Mills, Sylacauga, Ala., and accepted position as overseer of spinning at Alexander City, Ala.

R. A. SIMS has resigned as overseer of weaving at Warrenville, S. C., to accept a similar position at the Glenn-Lowry Mills, Whitmire, S. C.

J. H. HOWARD has resigned as overseer of weaving at the Glenn-Lowry Mills, Whitmire, S. C., to accept a similar position with the Ware Shoals (S. C.) Mfg. Co.

G. R. QUIMBY, formerly carder at the Waypoyset Manufacturing Co., Central Falls, R. I., and more recently of the Newmarket Manufacturing Co., has accepted the position as overseer of carding at the Goodyear Cotton Mills, Killingly, Conn.

C. C. MCJUNKIN has been promoted from second hand to overseer of cloth room at Courtenay Mfg. Co., Newry, S. C.

W. E. RAMBOW has accepted a position as night overseer of twisting and spooling for the General Asbestos Rubber Co. He was formerly at Bennettsville, S. C.

C. E. GAILLARD, formerly carder at Newry, S. C., has accepted a position as carder at Seneca, S. C.

J. L. COOPER, has returned to his former position as overseer of carding at Lois Mills, Douglasville, Ga.

THOMAS CONNORS has accepted a position as overseer of knitting for the Van Dyke Knitting Co., Milwaukee, Wis. He comes from Malden, Mass.

B. F. MCCLURE has changed from night spinner at the Hannah Pickett Mills, Rockingham, N. C., to overseer of spinning for the Entwistle Mfg. Co.

W. H. HEARN is promoted from spinner in No. 3 Hanes Mill, Winston-Salem, N. C., to general overseer of spinning in No. 3 and No. 4.

W. F. SMITH has resigned as night superintendent, Porterdale, Ga., to accept position as overseer of spinning, Mill No. 2, Fulton Bag and Cotton Mills, Atlanta, Ga.

H. B. WILLIAMS, formerly overseer of spinning and twisting at Manetta Mills, Lando, S. C., has changed to same position at night with West Point Mfg. Co., Fairfax, Ala.

J. P. ELLER has resigned as overseer of weaving at the Aragon Cotton Mills, Rock Hill, S. C., to accept a similar position at the Chadwick-Hoskins Mill No. 3, Charlotte, N. C.

ALEXANDER MILEAU has accepted a position as overseer of spinning for the Manhasset Manufacturing Co., Putnam, Conn. He comes from the Goodyear Cotton Mills, Killingly, Conn.

J. K. WARD has changed from second-hand for the Savona Mfg. Co., to overseer of weaving for the Fidelity Mfg. Co., Charlotte.

GUY MELCHOR, WHO REPRESENTS THE ARABOL COMPANY IN A NUMBER OF SOUTHERN STATES.

A. L. CARMEN, from the Victor Mill, Greer, S. C., has accepted position of overseer of weaving at the Aragon Mills, Rock Hill, S. C.

A. M. White is promoted from loom fixer to night overseer of weaving at the Hannah Pickett Mills, Rockingham, N. C.

W. H. LONG has been promoted to overseer of spinning at Saxony Spinning Co., Lincolnton, N. C.

O. A. SULLIVAN from Union, S. C., is appointed overseer of carding at Steele's Mills, Cordova, N. C.

J. R. MANLEY has resigned position as overseer of carding, Seneca Cotton Mills, Seneca, S. C., to accept similar position at Mills Mfg. Co., Greenville, S. C.

RAMSOUR HOLDER has resigned as second hand in spinning, Climax Mill, Belmont, N. C., and accepted position as overseer of spinning, Pinkney Mill, Gastonia, N. C.

B. P. ODOM from Greenville, S. C., has accepted position as overseer of carding at Edenton (N. C.) Cotton Mills.

(Continued on page 136.)

How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects

Balance Twist.

EDITOR COTTON:

Some time ago you printed a number of articles and letters in your Discussion Department relative to the subject of balance twist. However, there are some features of this discussion that I think are not quite clear and I am submitting herewith three problems for further discussion. I shall appreciate it very much if readers of the Discussion Department will take an interest in this and furnish as full details as possible concerning how they would manage under similar conditions.

Example 1. Suppose a mill gets an order calling for 40's two ply, standard four in two ply, and corded to four ply and make it balance. What should be done? The term "standard four" as I understand it refers to the twist and means four times the square root.

Example 2. This example is exactly the same as the preceding example with the exception that the 40's two ply is corded to 40's six ply and must balance.

Example 3. In this example suppose the order calls for 40's three ply standard four and a half corded to 40's six ply and made to balance. What about this case?

I shall look forward with interest to the replies to these questions. Honey (R. I.),

Lumpy or Uneven Slubber Roving.

EDITOR COTTON:

Replying to "Wingo" S. C., a .63 hank slubber roving is made from a 65 grain card sliver with one process of drawing. The slubber roving is uneven and lumpy. What is the cause? Front roll of the drawing frames runs 200 r.p.m.

Right at the start it is very evident that the trouble is not caused by excessive speed at the drawing frame as 200 r.p.m. is slow speed for this type of machine.

In the case in question, we must take it for granted that the card sliver is in good shape, that the webs as they come from the doffers, are free from lumps, breaking selvages, and cloudiness. If any of these defects obtain, it is useless to expect good work in the later processes; especially with but one process of drawing.

With a very good card sliver to start with and excellent drawing frame help—skillful and conscientious—it is difficult even then, to procure good drawing with but one set of frames. Two processes at the least should be the layout. One process of drawing lacks the required doubling and attenuating to even up the thick and thin pieces, and get the fibres sufficiently parallel to each other so as not to make a fuzzy, uneven sliver that is hard to draw on the slubbers. The fibres are still so tangled that in some places they draw much harder than in others, making the resultant roving full of thick and thin places.

In the present case it is safe to assume that the layout with one process of drawing has been producing work in the past that answered requirements. For some reason, at present, the slubber roving is not up to the standard.

The first thing to do is to note whether all the slubbers are turning out this bad work or if it is only one machine. If only one slubber is faulty, it is safe to consider that the fault lies directly with that machine. Look after a broken gear tooth—in the draft train—too much tension between front roll and bobbins, badly worn top rolls, incorrect roll setting, or lack of oil.

If all the slubbers are running badly, caused by scattering ends here and there; take a piece of drawing about five feet long from one of the cans which is making bad work. Place your foot on one end of the drawing and insert twist by rolling the other end between the palms of the hands. If it is very uneven, the lumps will show clearly. By passing the thumb and finger over the twisted strand, the unevenness can be felt. If this defect is found, then look to the drawing frames for the trouble.

Test out every delivery of drawing in the same manner as used on that piece back of the slubber. If only one delivery on a frame is found making this bad work, look for trouble with this delivery only. The cause may be: roller laps on top or bottom rolls, foreign material in flutes—if metallic rolls—or lack of oil which might cause the saddles to bind on the middle and back top roll necks and retard revolution.

If every delivery on a frame makes bad work, look for a broken gear tooth, a gear not sufficiently meshed—defects will be regularly spaced if trouble is with gears—lack of oil on the top rolls, or badly arranged cans back of the frame causing excessive strain on the card sliver.

One other thing to note, and it is a vital one, is to see that the holes in the trumpets are not worn too large. If they are, they will not sufficiently condense the sliver, leaving it weak and easily stretched. Also see that the nose of the trumpet is down close to the bite of the calender rolls, or the drawing will be very lumpy from the irregular plucking it gets by the calender rolls. This defect and that caused by too *small* a hole in the trumpet, show up much alike in the running frame. The sheet of sliver as it leaves the front rolls, will be continually bagging and taking up.

Another cause of trouble is the calender roll gear. In damp weather when the sliver bags between front roll and trumpet, sometimes the calender roll gear is changed to take up a little faster. When the damp weather is over, the change in the gear may be forgotten and then the sliver is stretched.

Bad work is often caused by a disarrangement of the top roll weights. A heavy weight may be placed on one end of a roll, while at the other end there may be a light weight. If one delivery is found weighted wrong, look over *every* delivery.

If the work on the slubber has been running all right

and then suddenly begins to slow up uneven, the first thing to do is to staple the cotton being run. See if it is the same as you have been using right along. Longer stapled or shorter stapled cotton than regularly run will immediately show up uneven and lumpy, though long staple will easily betray itself by a frequency of hard ends—undrawn sliver or roving. Short staple shows up in a cloudy blotchy sheet at the drawing with frequent breaking at the trumpet. On the slubber the short staple draws unevenly on account of the spread of the rolls, and it has a tendency to run slack and break.

The cure in this case is to immediately set the rolls to accommodate the length of staple. Be sure the top rolls are set parallel to the bottom rolls or the bad work will continue. Rogege (Conn.).

EDITOR COTTON:

Please allow me space in your valuable paper to give "Wingo," (S. C.), an answer to his question. First, the slubber draft is too much. If the hank roving is 63 we have a draft of 4.15. If it is 68 hank roving, we have a draft of 4.48. I think if "Wingo" can get the draft to 3.50 or 3.25 that his lumps will stop. His roll settings, slubbers or drawing might not be right for the staple of cotton being used, or for the weight of his goods. I think his drawing roll speeds are rather slow. The trouble might be in his one process of drawing. As I have never tried this myself, I couldn't say, but have known of it being tried and having failed, and know of one mill making 10's and 14's yarns out of middling cotton on one process of drawing and making good strong even yarn at high production and good running work.

It is hard to give an answer to a question like this. If "Wingo" will state through your paper what grade of cotton he is using, what ounce lap on his cards, the card settings, and the speed of the cylinder and doffer of his cards, how many ends he puts up on the back of the drawing, the roll settings on the drawing, the r.p.m. of the front roll, the roll settings on the slubber and speed of its front roll, I believe I could help him. Of course the condition of the machinery has a great deal to do with it.

H. J. M. (N. C.)

The General Electric Co. in Bulletin No. 41021 describes a line of adjustable speed motors which are the result of many years of experience and numerous tests under actual shop operation. There are many special advantages achieved in this type motor. Two worthy of mention are the practical elimination of commutation troubles arising from abuse or careless operation; secondly, the main field coils are so designed as to withstand, without injury, full potential continuously with the armature at rest. Special attention has also been given to the efficiency regulation, stability and insulation.

No soldier would think of going "over the top" "over there" unless he was confident that his equipment was in first class order. Over here no manufacturer should consider an attack for bigger business unless he had every detail in his establishment at the greatest pitch of efficiency. The textile man who desires to carry on with maximum success should make use of a splendid line of supplies such as those made especially for him by The Arabol Mfg. Co., 100 William St., New York City.

Figuring a Yarn Mill Layout.

EDITOR COTTON:

Sometime ago I had a series of questions submitted to me by a mill superintendent that not only required considerable careful figuring, but that are of so interesting a character that I am submitting the whole thing to your department, "How Other Men Manage," in the hope that it will be interesting and instructive to others.

Briefly, he desired the proper layout for a 5000 spindle mill for the manufacture of hosiery yarns in an average number of 10's. This reply was to furnish the complete organization of machinery, draft, speeds, etc., including approximate cost, power used, and stock required at each process. The cotton used, to be one inch uplands.

Following in tabular form are my replies:

ORGANIZATION FOR NO. 10's HOSIERY YARN.

DRAFTS.

10's yarn.

Spinning draft 8.

2.50 H. R. Fine frame.

Fine frame draft 5.

1.00 H. R. Intermediate frame.

Intermediate frame draft 4.

.50 H. R. Slubber.

Slubber draft 3.4

55 Grain sliver.

Drawing frame draft 6.

Doublings 6.

55 Grain card sliver.

Card draft 90.

5 per cent waste.

12 oz. Finisher lap.

13.5 oz. Breaker lap.

SPEEDS OF MACHINES.

Lappers	Beater speed	950 r. p. m.
	Fan speed	1400 r. p. m.
	Lap rolls speed	7 r. p. m.
Cards	Cylinder	160 r. p. m.
	Doffer	11 r. p. m.
	Licker-in	420 r. p. m.
Drawing	Front roll 1¼ inch	300 r. p. m.
Slubber	Spindles	600 r. p. m.
	Front roll	180 r. p. m.
Intermediate	Spindles	850 r. p. m.
	Front roll	200 r. p. m.
Fine	Spindles	1100 r. p. m.
	Front roll	164 r. p. m.
Spinning	Spindle	4000 r. p. m.
	Front roll	145 r. p. m.

Twist Per Inch = 8.7.

The twist per inch in the roving = square root of the hank × 1.2.

The twist per inch in the roving = square root of Number × 2.75.

ORGANIZATION OF MACHINERY.

5040 Spinning spindles, 3¼ inches gauge, 6 boss roll.
Production 4.88 pounds per spindle per week.
Diameter of ring 2⅛ inches, traverse 7½ inches.
Range of numbers 10's to 15's (21 frames 240 spindles each).

1080 Fine frame spindles 8 inches x 4 inches, 4.02 pounds per spindle per day.

View of Two of the Three Freight Platforms

C. V. TRUITT, Pres.
S. Y. AUSTIN, V. P. & G. M.

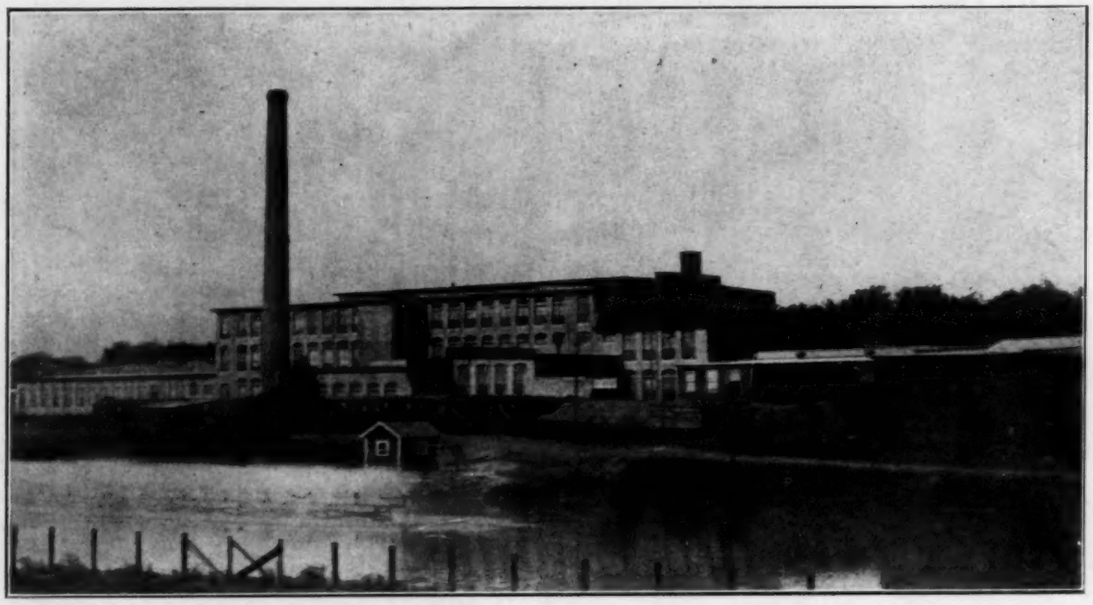
FULLER E. CALLAWAY, Treas.
J. A. PERRY, Secretary.

VALLEY WASTE MILLS

Hillside Cotton Mills, Owners

LAGRANGE, GA.

Cason J. Callaway, Asst. Treas. & Mgr.



WE PURCHASE every grade of waste that is produced in a cotton mill. Before contracting for your 1918 production, be sure to give us an opportunity to figure with you. Transportation difficulties are growing greater daily, but no embargoes are likely to be placed on lines coming into LaGrange.

8 More Letters That Show You

COVINGTON MILLS
MANUFACTURERS OF
FINE SHEETING
COVINGTON, GA.

Sept.5,1917.

Valley Waste Mills,
LaGrange,Ga.

Gentlemen:

Regarding Waste for 1918:

We have had business dealings with you practically since you began business and it is a great pleasure to testify to your thorough responsibility and fair and square methods.In all our business relations we have never had the slightest misunderstanding, and prices being equal it will still be our pleasure to continue business with you good people.

Very truly yours

Pres.and Treas.

OFFICE OF
THOMASTON COTTON MILLS.

THOMASTON, GA., August 31, 1917.

Valley Waste Mills,
LaGrange, Ga.

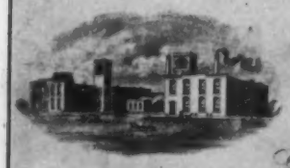
Gentlemen:-

We have sold you our entire production of Waste for the past two years and wish to state that our relations have been both profitable and pleasant. Knowing personally all of the officers of the Valley Waste Mills, we are confident of both their moral and financial responsibility and know that no matter what conditions might arise, that Waste bought by them will be taken in and paid for promptly and cheerfully.

In unprecedented times like we are having now, we feel that a mill of this caliber should be appreciated and would take pleasure in recommending you to any one contemplating selling their Waste.

Yours very truly,
Thomaston Cotton Mills.
By

WHB/B Treas.



Modena Cotton Mills.
FINE YARNS AND SHEETINGS

Gastonia, N.C. August 23, 1917

Mr. Cason J. Calloway,
Valley Waste Mills,
La Grange, Georgia.

Dear Mr. Calloway:-

I am just in receipt of your esteemed favor of August 22nd, and I assure you that I have read it with a great deal of pleasure.

I wish to say to whom it may concern, that my relations with the Valley Waste Mills of La Grange, Georgia, have been exceedingly pleasant. One of the first things that impressed me in my dealings with these people, was their promptness in meeting their obligations, and an utter absence of that continual bickering that characterizes the dealings of some of the Waste people over the Country.

You have my permission to use this letter in any way that it will serve you.

Trusting that our pleasant relations may continue and with kindest personal regards, I remain,

Yours very truly,

President & General Manager.

A. J. EVANS
FORT VALLEY, GA.

Aug. 28th, 1917

Valley Waste Mills,
LaGrange, Ga.

Gentlemen;

Replying to yours of 22nd I beg to advise it affords me much pleasure to state that for 1916 and 1917 we sold our entire output of waste from the Fort Valley Cotton Mills and the Fort Valley Knitting Mills to your good concern (Valley Waste Mills at LaGrange) and I cannot commend too highly the manner in which you have handled this business. When we sell to the Valley Waste Mills we are assured that, no matter what market conditions are, they will accept the waste without any quibbling and same will be paid for promptly. It is a great pleasure to do business with a concern with the integrity and calibre of the Valley Waste Mills.

Yours very truly

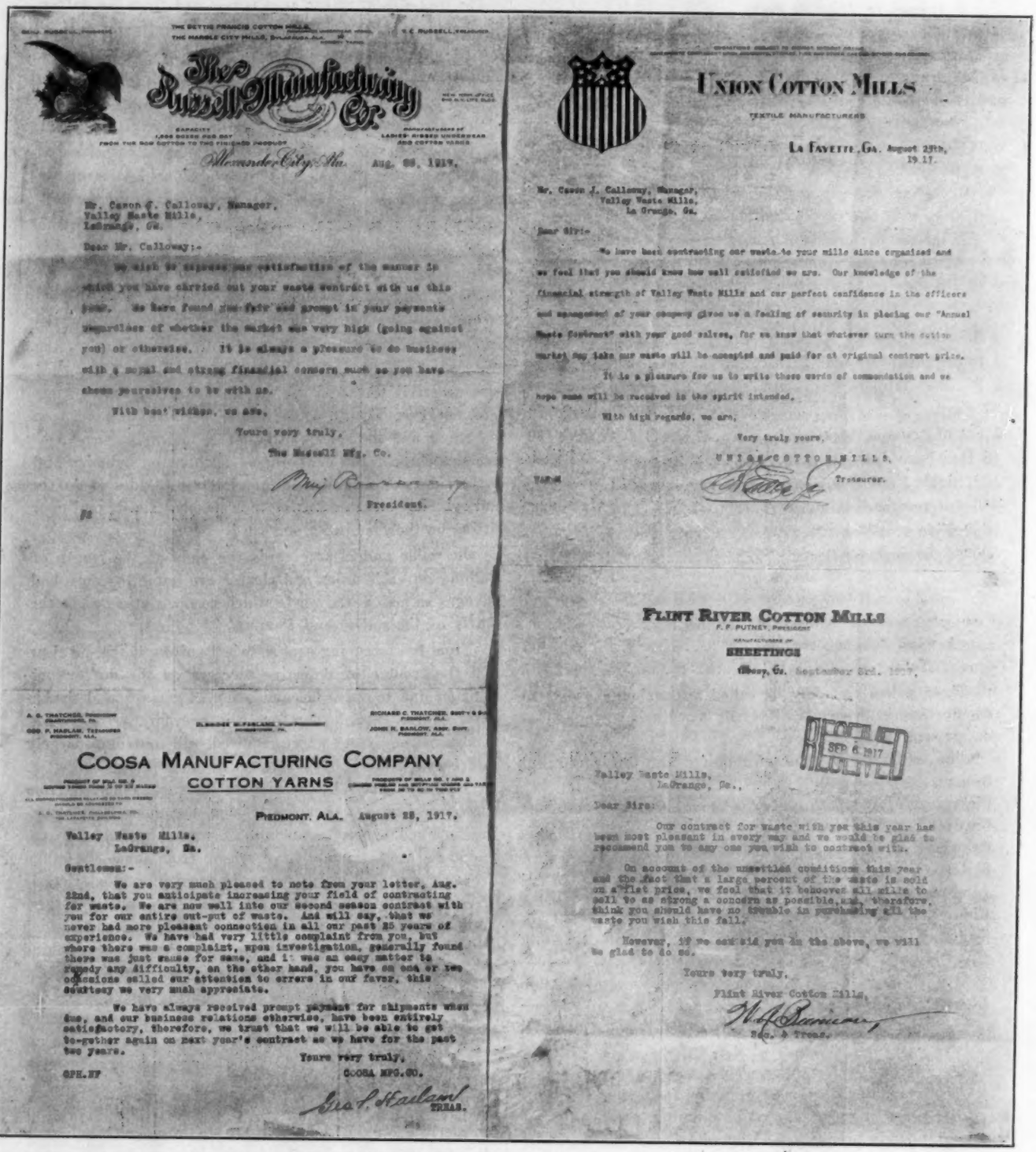
AJE/B

WE PURCHASE EVERY GRADE OF WASTE

HILLSIDE COTTON MILLS, OWNERS

VALLEY WASTE MILLS,

Where to Sell Waste With Security



THE RUSSELL MFG. CO.
Alexander City, Ala. Aug. 28, 1917.

Mr. Cason J. Calloway, Manager,
Valley Waste Mills,
LaGrange, Ga.

Dear Mr. Calloway:-

We wish to express our satisfaction of the manner in which you have carried out your waste contract with us this year. We have found you fair and prompt in your payments regardless of whether the market was very high (going against you) or otherwise. It is always a pleasure to do business with a legal and strong financial concern such as you have shown yourselves to be with us.

With best wishes, we are,

Yours very truly,
The Russell Mfg. Co.
President.

UNION COTTON MILLS
TEXTILE MANUFACTURERS
LA FAYETTE, GA. August 29th, 1917.

Mr. Cason J. Calloway, Manager,
Valley Waste Mills,
La Grange, Ga.

Dear Sir:-

We have been contracting our waste to your mills since organized and we feel that you should know how well satisfied we are. Our knowledge of the financial strength of Valley Waste Mills and our perfect confidence in the officers and management of your company gives us a feeling of security in placing our "Annual Waste Contract" with your good selves, for we know that whatever turn the cotton market may take our waste will be accepted and paid for at original contract price.

It is a pleasure for us to write these words of commendation and we hope same will be received in the spirit intended.

With high regards, we are,

Very truly yours,
UNION COTTON MILLS,
Treasurer.

COOSA MANUFACTURING COMPANY
COTTON YARNS
PIEDMONT, ALA. August 28, 1917.

Valley Waste Mills,
LaGrange, Ga.

Gentlemen:-

We are very much pleased to note from your letter, Aug. 22nd, that you anticipate increasing your field of contracting for waste. We are now well into our second season contract with you for our entire out-put of waste. And will say, that we never had more pleasant connection in all our past 25 years of experience. We have had very little complaint from you, but where there was a complaint, upon investigation, generally found there was just cause for same, and it was an easy matter to remedy any difficulty, on the other hand, you have on one or two occasions called our attention to errors in our favor, this courtesy we very much appreciate.

We have always received prompt payment for shipments when due, and our business relations otherwise, have been entirely satisfactory, therefore, we trust that we will be able to get together again on next year's contract as we have for the past two years.

Yours very truly,
COOSA MFG. CO.
TREAS.

FLINT RIVER COTTON MILLS
F. P. PUTNEY, PRESIDENT
SHEETINGS
Albany, Ga. September 3rd, 1917.

RECEIVED SEP 6 1917

Valley Waste Mills,
LaGrange, Ga.,

Dear Sirs:

Our contract for waste with you this year has been most pleasant in every way and we would be glad to recommend you to any one you wish to contract with.

On account of the unsettled conditions this year and the fact that a large percent of the waste is sold on a "list price", we feel that it behooves all mills to sell to as strong a concern as possible, and, therefore, think you should have no trouble in purchasing all the waste you wish this fall.

However, if we can aid you in the above, we will be glad to do so.

Yours very truly,
Flint River Cotton Mills,
Sec. & Treas.

THAT IS PRODUCED IN A COTTON MILL

CASON J. CALLAWAY, ASST. TREAS. & MGR.

LaGRANGE, GEORGIA.

9 frames 120 spindles each.
400 Intermediate spindles 10 inches x 5 inches, 11 pounds per spindle per day.
5 frames 80 spindles each.
192 Slubber frame spindles 12 inches x 6 inches, 22.4 pounds per spindle per day.
3 frames 64 spindles each.
24 Deliveries of finisher drawing, 184 pounds per day per delivery.
24 Deliveries of breaker drawing, 184 pounds per day per delivery.
33 Revolving flat cards, 27 inch doffer, 135 pounds per day, with one card grinding.
2 Finisher pickers, two bladed beater 18 inches.
2 Intermediate pickers, two bladed beater 18 inches.
2 Breaker pickers with automatic feeders.

ESTIMATED COST OF EQUIPMENT.

2 Breaker lappers	$1500	$3000
2 Intermediate lappers	1000	2000
2 Finisher lappers	1000	2000
33 Cards	720	23760
1 Set of grinding tackle		190
48 Deliveries drawing	80	3840
192 Slubber spindles	13.50	2592
400 Intermediate spindles	10.5	4200
1080 Fine spindles	7	7560
5000 Spinning spindles	4	20160
		$69,302
Five per cent of equipment for belting, skewers, bobbins, etc.		3465
Total		$72,767

These prices can only be called approximate owing to the fluctuation in prices of textile machinery then and at the present time.

The estimated horsepower required for this equipment follows:

Pickers	40 h.p.
Cards	10 h.p.
Drawing	12 h.p.
Slubbers	5 h.p.
Intermediates	9 h.p.
Fine	22 h.p.
Spinning	84 h.p.
	182 h.p.
Plus 25 per cent	46 h.p.
	228 h.p.

STOCK REQUIRED AT EACH PROCESS.

24,595 pounds production of spinning room.
2 per cent waste allowed in spinning.
25,087 pounds production of speeders.
3 per cent waste allowed in roving and drawing.
25,840 pounds production of card sliver.
5 per cent waste allowed in carding.
27,142 pounds production of finisher laps.
5 per cent waste allowed in picking.
28,482 pounds fed to breaker picker.
5 per cent allowed for bagging and ties.
29,906 pounds of cotton bought per week.

H. K. Dick. (N. C.)

Locating Mill Troubles.

EDITOR COTTON:

The thin web of cotton as it is removed from the doffer wire by the doffer comb is sometimes defective at one or both selvages. This can be caused in several ways, but the fault is not as common nowadays on revolving flat cards, as when roller and clearer cards were more in use. On revolving flat cards, the causes of the doffer web having defective selvages are as follows: The wire at the sides of the cylinder and doffer being ground down too much by the narrow grinding roller and thereby preventing the doffer comb being properly set all along the entire width; an excessive accumulation of fly beneath the undercasings or grids of the licker-in and cylinder especially at the front of the cylinder undercasing; oil on the ends of the licker-in and cylinder; an accumulation of waste between the licker-in grid bars near the card sides; roughness on the grid bars or undercasings; a lap at the back of the card with defective selvages; the lap guides at the back of the card not correctly adjusted; waste accumulating between the frame and the sides of the doffer and cylinder; defective tapering of the ends of the clothing on cylinder and doffer; defective nailing of the clothing at sides of doffer and cylinder; clothing at flat ends slovenly fixed; and poor fitting on the framing of the card.

On roller and clearer cards the ends of the length of clothing on each roller and clearer are liable to cause bad selvages as also is the waste which becomes attached to the shafts of the rollers and clearers.

From the foregoing causes, briefly given, it will be clear that the trouble of defective selvages on the doffer web is often due to waste accumulating at certain undesirable parts of the card. Therefore, the preventing of waste amalgamating except where required, will contribute largely to freedom from bad selvages on the doffer web.

The unevenness in the amount of waste removed from successive flats often causes trouble, i. e. some flats bringing forward a greater amount of waste, or the comb removing a greater quantity of waste, from some flats than from others; also when the waste from individual flats is irregular in thickness along the flats. The causes of these faults are that some flats may have the milled ends, which slide on the flexible bends, worn more than others, making the distance between the wire on some flats and the cylinder wire more than is the case with others; dirt clogged between the ends of the flats and the chain, and neglecting to remove this dirt often causes the flat ends to wear unevenly and also prevent the flats being as accurately set to the cylinder; the wire on some flats may be longer than on others; the spiral cleaning brush not cleaning the flats properly after they have left the stripping comb will cause this trouble; the under flat brush either working incorrectly, or requiring renewal owing to being worn down will produce unevenness; newly covered flats here and there being attached to the chain of flats; dirt on the front knife plate; front knife plate buckled either inward or outward; damp flats; flat brush not set deep enough; damaged licker-in teeth; dirt or waste wedged in the grids or undercasings sufficiently to interfere with the cotton on the cylinder wire; the pulleys or bowls, over which the flats

move, worn irregularly; occasional flats "riding" on the chain; flats too slackly attached to the chain; rough places on the front knife plate; or blisters having formed on the clothing of the cylinder, are also causes of this trouble which should be looked after and remedied.

By cloudiness in the web is meant the unevenness in which the fibres are distributed in the web as it leaves the doffer, the web being blotchy or many more fibres in some parts of the web than at other parts. The causes for this fault are neglecting to remove the waste after it has been stripped from the flats; the revolving flat card situated in the direct course of a draught from a door or a window; dents in the cylinder or doffer wire; the ordinary work of stripping the cylinder and doffer of waste being carelessly performed; dirt clogged in the flutes of the feed roller; defective piecing when renewing the lap at the back of the card; laps licking as they unroll at the back of the card; grinding of the wire on the cylinder, doffer and flats not performed often enough; felting of the wire on the clothed parts of the card; the waste from under the cylinder and licker-in not removed often enough; the licker-in cover not fitting properly at all points; the licker-in cover not the correct distance from the feed plate; the various parts of the card not correctly adjusted in relation to one another; weak feed roller; bent feed plate; the rod between the feed roller and the licker-in cover not fitting properly, or the roller being unevenly covered; the licker-in cover not being perfectly straight; impurities not being removed from the cotton as they should be; the front knife plate set too near the cylinder; the mote knife under the licker-in not properly set; the doffer set too far from the cylinder either at one side or all the way across; the stripping of the waste from the doffer and cylinder not being performed often enough; the spirals of the clothing on the cylinder and doffer not close enough; blisters in the clothing; small patches of wire broken out of the clothing on the cylinder and doffer; laps badly knocked out of shape; or the lap roller on the card too smooth.

Very careful measures are adopted in some mills to reduce the amount of dirty and oil stained roving to practically a negligible quantity, but in other mills a very casual inspection is undeniable proof that these faults are not given the attention that they merit, consequently some classes of cloth require a deal of time spent on them to remove the oil stains by an application of benzine or some other solution for the purpose. The causes of these faults are the fly frame tender allowing the full bobbins to fall on the floor during creeling; the tender having dirty and oily hands and not cleaning them before performing the operation of creeling; using dirty boxes to store full roving bobbins; full roving bobbins rolling on the floor owing to the conveying boxes being filled to excess; elevator attendants being allowed to place dirty boxes on top of boxes filled with roving; the bottom ends of the roving bobbins becoming oily and dirty; full roving bobbins thrown carelessly into the conveying boxes during doffing; the waste not removed from the roving guide rods, traverse guides, and creels, at sufficiently frequent intervals; cleaning the pulleys on the line shafts, pulleys over the frame end, and parts of the roof over the frame, and allowing the waste to settle on the creel or become attached to the material as it is passing through the frame; excessive oiling of the spindles, spindle collars, bobbin bevel gears, top leather covered rollers, bottom steel rollers, and differential motion gearing; or the bobbin or movable carriage not cleaned suffficiently often of waste and oil.

A few suggestions to reduce the amount of dirty and oil stained roving are as follows: The cause should, of course, be traced and removed; have the tenders remove any dirty waste attached to full roving bobbins before placing them in the creel; periodically clean all conveying boxes for full roving bobbins and subject the insides of the boxes to a dusting of French chalk; have the tenders arrange the full bobbins in the boxes in a straight manner instead of throwing them in indiscriminately; do not oil any part to excess; protect the roving bobbins on and in the creel to prevent the waste from cleaning above the frame becoming attached to the roving; use special oil cans; thoroughly clean a certain number of empty roving bobbins daily; exhibit a number of pieces of cloth containing oily yarn to the mill officials at certain times during the week; have each ring frame tender remove all oily lengths of roving that are noticed so that the spinning overseer can forward them to the cardroom overseer; have a spare operative to walk round each ring frame and remove all roving bobbins from the creel that have any oily material on them and return them to the card room for the defective roving to be removed; encourage the spinning department operatives to remove all defective roving by awarding them a small financial bonus according to the amount of oily and other types of defective roving removed.

The subject of uneven yarn is so vast that a large number of pages could be written and yet leave a great deal to say on the subject. Some of the causes and hints to overcome the trouble are as follows: Roving not sufficiently twisted and causing it to stretch as it is unwound at the ring frame; scutcher laps not level; scutcher laps licking; it is a good plan to cut separate yard lengths from the lap and weigh them to ascertain the regularity in weight; defective mixing of waste along with the cotton; drawing rollers at any of the frames from drawing frames to ring frames not properly set; rovings too fine; cap bar nebs allowing the top rollers to rock back and forth on the bottom rollers; leather covered rollers too soft, hollow, or channelled on the surface; drawing frames not properly attended to when using metallic rollers; neglecting to maintain the middle and back bottom steel rollers free from waste; traverse motion not correctly adjusted; the blending of cottons that are too widely different in length of staple; the top rollers in all the machines must be properly weighted and oiled; the fly frame tenders must not be allowed to "jack up" one or more teeth; the automatic stop motions on the drawing frames must all be in order; excessive drafting of the cotton at any machine; trying to make profit by using cheaper cottons; sections of bottom steel rollers not absolutely tight at the joints; the roving guide rod not in the correct position when spinning very fine yarns; excessive speed of machinery; strained bottom rollers at any of the machines; top rollers not kept clean; or the intermediate drafts at any machine not properly proportioned.

When a mill is troubled with uneven yarn, the officials ought to be able to at once locate the cause by carefully examining the yarn and the roving. Careful attention must

SAVING THE WASTE

Friction, the monster evil of industry, disappears before New Departure Ball Bearings.

The saving of this waste benefits many departments of a manufacturing plant.

New Departure Ball Bearings conserve mechanical energy in the making and in transmission.

They increase production by making it possible to use this additional power.

They prevent the needless tearing down of machines to replace short lived bronze bushings.

Last and most important of all, they show a saving on the cost sheets which are largely responsible for the success of any organization.

"Ball Bearing Applications," sent upon request, will make it easy for you to consider applying these improvements to your plant.

THE NEW DEPARTURE MANUFACTURING CO., BRISTOL, CONN.
Conrad Patent Licensee.

NEW DEPARTURE
BALL BEARINGS

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be paid to the proper selection and mixing of the cotton in accordance with the required fineness and quality of the yarn. Many a mill has been troubled with uneven yarn for weeks and all the machinery carefully inspected when the real cause was unsuitable cotton or cotton improperly mixed.

Practical Superintendent.

Cotton and Artificial Leather.

Within the last ten years an industry has developed in our country from small beginnings to great importance, of which the general public is hardly aware. It is the manufacture of artificial leather, the chief ingredient of which is cotton. The only data collected by the Bureau of the Census are to be found in the quinquennial census of manufacturers, the last of which comprises the year 1914. There were reported ten establishments, and the gross value of their products amounted to $6,097,000. At the census of 1909 there were twelve establishments producing products valued at $3,129,000, so that the manufacture doubled in the five years preceding the war. Since 1914 various circumstances have opened new outlets for these goods. The number of factories has greatly increased, and some of them, like the Dupont Fabrikoid Company, have taken on gigantic proportions. This establishment is said to produce one million dollars' worth of artificial leather per month. Among the other factories, the best known are probably the Pantasote Company of New York and the Keratol Company of Newark.

Artificial leather is an entirely different fabric from cotton-fibreboard and leatheroid, both of which are largely used in the making of indestructible trunks and sample and suit cases. These are made of cotton waste, linters, flax waste, cotton rags and sometimes of wood, which are worked into a pulp, then treated with dyestuffs and other chemicals and pressed into sheets like metal. They are extremely hard and need considerable power to saw them and bend them into shape. Artificial leather is, however, a textile material, the base of which is a roll of cotton cloth varying from thin muslin to drills and even heavier materials, somewhat like oilcloth. The cotton cloth is covered by a paste which varies in every factory, but which requires gun cotton, oil, acetaniline, lead colors and other chemicals. On the top of this is put a very thin celluloid dressing, and, when the artificial leather is completed, it is put through steel rollers that impress upon it a grain to imitate whatever kind of real leather it is supposed to represent. We are informed that cotton makes up about three-quarters of the weight of artificial leather.

The uses to which artificial leather is put are manifold. Some of the articles made of this product are hat-sweatbands, belts, grips, suit cases, trunks, slippers, pocketbooks. grip handles, suspender ends and similar trimmings, toilet rolls, fancy leather goods and novelties. It is also used in the book-binding trade. Shoe factories have taken it up for inner soles, while top leather and sole leather imitations are still in the experimental stage. The largest use for this article, however is found in automobile factories and cheap furniture factories, because it is excellent for upholstery purposes.

The consumption of Fabrikoid, Pantasote, Keratol and other leather substitutes has so far been chiefly domestic, although exports have increased. The Department of Commerce gives the exports for the last three years as follows: 1914, $358,595; 1915, $435,858; 1916, $586,893. While the present scarcity of leather has no doubt helped the development of this industry, the cost of the article will always tend to expand its usage. Leather today costs about one hundred per cent more than two years ago. Imitation leather sells today at about one-third the prices of the genuine article.

This data was compiled by A. A. Hausman & Co., and embodied by them in a trade circular.

Lancashire Notes.

(Continued from page 110.)

tempts were made to place three workers on the mules the spinner and his piecer saw that the effect would be lower wages. Hence the strikes, which were undertaken without notice or the sanction of the trade union. A settlement has been reached which is, in effect, no settlement at all. Under the terms, at mills where, on the day of the beginning of the strike, no agreement had been come to with regard to staffing, work is being resumed under the old conditions, with the understanding that operatives and managers immediately set to work and endeavor to arrive at a mutually satisfactory arrangement, failing which the matter will be settled by the Control Board. But the temper of the men is such that it is recognized that the Board's rule of "fully and efficiently" staffing mules cannot be enforced. Thus an essential part of the Board's scheme is violated. Add to this that the Board instructed all the firms affected to take legal proceedings against the strikers for having left work without notice and then on the insistence of the strikers, had the proceedings withdrawn, and add also that the Board instructed the employers to withhold all wages due when the strikes began and that those wages have now been paid, and it will be seen that the authority of the Control Board has received something of a shock.

It All Depends.

"When a Plumber makes a mistake he charges twice for it.

"When a Lawyer makes a mistake it's just what he wanted, because he has a chance to try the case all over again.

"When a Carpenter makes a mistake it's just what he expected, because chances are ten to one that he never learned his trade.

"When a Doctor makes a mistake he buries it.

"When a Judge makes a mistake it becomes the law of the land.

"When a Preacher makes a mistake nobody knows the difference.

"When a Cotton Manufacturer makes a mistake he pays for it.

"When an Electrician makes a mistake he blames it on induction; nobody knows what that is.

"But when an Editor makes a mistake, Good Night!"

Liquid Chlorine

Cylinder with Cap Off
Height 54 inches

Advantages of Liquid Chlorine as a Bleaching Agent

(1) The bleaching solution is very easily and simply prepared, necessitating little or no attention or labor.

(2) Its use does away completely with the very disagreeable features accompanying the preparation of solutions of chloride of lime.

(3) There is no settling of the solution required as with chloride of lime, and consequently no disagreeable sludge to get rid of.

(4) In the preparation of chloride of lime solutions there is always a great deal of "fly" or fine dust of the chemic which often causes serious trouble by injuring goods in the mill on which it settles. The use of Liquid Chlorine avoids all such injury.

(5) The bleaching value of the chlorine is fully utilized with Liquid Chlorine, whereas with bleaching powder, it is impossible to obtain all of the "available" chlorine from the dry powder in the solution. A good quality of bleaching powder contains 36 per cent. of "available" chlorine, but under the best conditions of preparing the solution it will only be possible to obtain in the solution 29 per cent. of "available" chlorine, the remaining seven per cent. being lost in the sludge, etc. Most mills, in fact, do not obtain as high a percentage as this, but only from 20 to 25 per cent. Liquid Chlorine is a 100 per cent. "available" chlorine, and there is absolutely no loss in the preparation of the bleaching solution.

(6) By the use of Liquid Chlorine no insoluble lime compounds are introduced into the goods. Where solutions of chloride of lime are employed for bleaching, there is always left in the goods a contamination of insoluble lime compounds which are exceedingly difficult to remove even by repeated washing and scouring. These lime compounds are liable to cause tendering and discoloration of the goods after a time, and hence it becomes the especial care of the bleacher to see that this defect is reduced as far as possible. All such troubles as these are avoided by the use of Liquid Chlorine, as all of the products from the bleaching solution are perfectly and easily soluble and so are readily removed from the goods by a simple washing. The only compound which is eventually formed from the bleaching liquor when its bleaching effect is finished is sodium chloride, or common salt. When sulphuric acid or sodium bisulphate is employed for souring, there is also formed some sodium sulphate or Glauber's salt. Both of these compounds are very soluble and are furthermore perfectly harmless to the fibre. Chemical analysis of identical cotton goods, bleached in mills formerly using chloride of lime and now employing Liquid Chlorine, show the following comparison of mineral matter left in the bleached goods under the best conditions of bleaching:

Insoluble mineral matter in cloth bleached with chloride of lime	0.15% to 0.25%
In cloth bleached with Liquid Chlorine	0.03% to 0.06%

(7) There is a positive increase observed in the tensile strength of goods when bleached with Liquid Chlorine as compared with same goods bleached with solutions of chloride of lime. Several of the largest bleacheries in the United States have reported an increase of 6 to 10 per cent. in the tensile strength of goods bleached with Liquid Chlorine.

(8) The use of Liquid Chlorine minimizes the danger of the formation of oxycellulose in either cotton or linen bleaching. It is almost impossible to totally avoid the formation of oxycellulose when bleaching with solutions of chloride of lime, as this chemic causes a partial decomposition of the cellulose of cotton and linen, resulting in a breaking down of the fibre cell and a consequent loss in strength to the fibre. One of the largest bleacheries in America has carefully studied the formation of oxycellulose when bleaching with chloride of lime and with Liquid Chlorine, and has adopted the latter process of bleaching on account of the uniformly higher quality of the bleached goods.

(9) Yarns and cloth bleached with Liquid Chlorine are much softer in "feel" than when bleached with chloride of lime, as it is well known that lime has the effect of making the fibre harsh. This increased softness is of great advantage to the finisher in producing a desirable "handle" to his goods.

(10) When using Liquid Chlorine for bleaching less acid (or sour) is required than for bleaching powder. This both tends to keep the goods softer and also greatly reduces the liability to tendering. It also results in a larger saving in the amount of wash water required.

(11) It is well known that chloride of lime is quite variable in its strength, whereas Liquid Chlorine is a product of absolute uniformity, its strength not being affected by length of storage or weather conditions.

(12) Chemic solutions prepared from Liquid Chlorine are especially adapted to the bleaching of cotton goods containing colored stripes or pattern effects. Even with the fastest colors available solutions of chloride of lime have to be used with great care, and bleaching by this means nearly always causes some bleeding of the color if a good white is required in the body of the fabric. By the use of solutions of Liquid Chlorine it has been found that a fine, clear white can be obtained with a minimum danger of the colors bleeding or being stripped.

It has been amply demonstrated in comparative trials under actual mill conditions and on a large scale, that where a bleach of high quality is desired with reference to clearness of color, freedom from deleterious substances, convenience and simplicity of operation, highest efficiency of bleaching agent, and possibility of scientific accuracy and control in the methods of bleaching, the use of Liquid Chlorine is a step far in advance of the crude methods where chloride of lime is employed.

Our representatives will gladly demonstrate Liquid Chlorine in your mill.
Be sure to write today for our interesting booklet. It's free. Just drop a post card.

ELECTRO BLEACHING GAS CO., General Offices 18 E. 41st St., **New York City, N. Y.**

The Utilization of the Potato.

BY H. C. GORE.

The necessity of providing some outlet for the cull potatoes as well as for the surplus crop during unusually favorable seasons is vital to the potato industry of the United States. Writers on agricultural subjects have not failed to describe the methods of potato utilization developed in Europe, especially in Germany, and to point out the desirability of better untilization of potatoes in the United States than now exists. Skinner states that in Germany the development of industries that take up the surplus is one of the most important causes of the phenomenally large production. Orton believes that there should be produced in the United States, as in Germany, many more potatoes than required for table use, and profitable utilization developed for the surplus, thus supplying the nation with this important foodstuff at a reasonable price, regardless of annual variation in yield.

The approximate distribution of our potato crop is given by Orton as follows: Out of an average production of 343,587,000 bushels 68 per cent is used for table purposes, 5 per cent is fed to farm animals, 11 per cent is used for seed, less than 1 per cent for the manufacture of starch, while about 15 per cent is lost from decay. In Germany, Orton states that of an average crop of 1,653,403,000 bushels, but 28 per cent is used for human food, 40 per cent is fed to farm animals, 12 per cent is set aside for seed purposes, and nearly 6 per cent is used for the production of potato alcohol. About 4 per cent is used for making starch and related products and about 10 per cent lost from decay.

MANUFACTURE OF POTATO STARCH.

The only potato product extensively manufactured in our potato growing sections is potato starch. It is produced in peace times at the rate of from approximately 20,000,000 to 25,000,000 pounds per annum in factories located in Maine, Wisconsin and Minnesota. In normal times about 16,000,000 pounds are imported. In Aroostook County, Maine, where the potato starch industry is most extensively developed, the price paid for the cull potatoes for starch purposes range from 8½ to 17 cents per bushel. The wholesale price in Maine for potato starch of good quality is about 3½ cents per pound in peace times. The yield of commercial starch from normal cull stock is about 15 per cent of the weight of the potatoes or 9 pounds per bushel. Smaller yields occur when frozen, partly decayed, overripe, or sprouted stock is used, but such material will usually make starch of fair quality. The present wholesale price of potato starch in northern Maine is 11 cents per pound. At this rate, allowing 1 cent per pound as the cost of manufacture, 90 cents per bushel could be paid for the potatoes, or $1.50 per cwt.

In potato starch manufacture the potatoes are washed in a continuous washing machine, then very finely ground, and at the same time mixed with water. The diluted potato pulp is then passed over shaking sieves, where the starch is washed out with the aid of sprays of water. The starch milk passes to settling tanks or runs where the starch is deposited in compact layers. The pulp either goes to waste or is pressed and used for feed, either fresh or after drying. The starch is transferred to washing tanks and thoroughly stirred with fresh water and allowed to settle. Most of the starch settles first, forming a compact mass at the bottom of the tanks, while the solid impurities, mixed with a little starch, form a layer on the surface of the starch and are removed. After washing, the starch is transferred to driers where it is slowly deprived of most of its water, commercial potato starch containing water to the extent of about 18 per cent.

Commercial potato starch manufacture is well suited for more extended introduction in our potato belt, especially as an enterprise for large factories in potato centers. For profitable operation large quantities of potatoes are required through a long season. Additional requirements are ample supplies of pure water and adequate drainage facilities for the waste waters.

Potato starch now finds its principal field of usefulness in the textile industry.

Potato starch can be made on the farm, and its preparation has been recommended by the Department of Agriculture as an enterprise for children's garden clubs. O. H. Benson has made available full directions for such preparation and recipes for its use. This information may be had on application to the Department of Agriculture.

If produced in larger quantities there can be readily absorbed in this country for starch purposes, a wide field of usefulness awaits it as a raw material in the manufacture of potato dextrin. Another product extensively manufactured from potato starch in Europe is potato glucose.

One of the difficulties of potato starch manufacture, as conducted in the United States, is the amount of labor necessary in transferring the starch from the settling tanks to the washing tanks and from the washing tanks to the drier. In addition to this, the factories are usually subject to rapid depreciation when idle.

MANUFACTURE OF POTATO DEXTRIN.

No potato dextrin industry exists in the United States as the present time. About 5,000,000 pounds per annum is imported in normal times. It is made by carefully mixing potato starch with a minute proportion of nitric or other acid, and then roasting at from 100° C. to 180° C. (212° to 356° F.), the temperature at which starch is converted into dextrin. The color of potato dextrin varies from pure white to brown through various shades of yellow and depends largely on the heat treatment given. The yield is about 80 per cent. of the weight of the starch. Potato dextrin finds a wide variety of special uses in the arts as an adhesive.

Necks.

The neck is that part of the human house which prevents the head from slipping into the chest.

The neck of a bottle is that part of the bottle's anatomy which allows the contents of the bottle to slip into the human chest.

Giraffes, swans and clams are noted for their necks. A neck isn't much of a thing to be noted for. It collects dirt and curious glances. A clam's neck, therefore, has some advantages over other necks.

A snake is an animal whose neck begins just back of its eyes and continues to the tip of its tail. Snakes digest their food in their necks, and when one has a pain he does not know whether it is caused by indigestion or a sore throat.

Think Of The Loss

THINK of the loss if your plant were to catch fire and burn down.

Even if it were covered completely by insurance, think of the lost profits on unfilled orders, the lost files of data, account books, etc., and you will resolve to protect your plant against fire.

But don't wait until you have burned out before protecting your plant. An ounce of prevention is worth a pound of cure. If a fire was to start in your mill, are you prepared to quench it before it gains headway? If not, then the cheapest and most efficient protection is with the aid of

ACME

Fire Extinguishers

They pay for themselves by reducing the cost of fire insurance, as insurance companies recognize their value and will reduce your rates if you install them. Ask your insurance agent.

They are big enough to extinguish a good sized fire, yet small enough to be quickly and easily handled.

They are examined, tested and labeled under the direction of the Underwriters' Laboratories, Inc.

Ask us today to send you prices of an installation of Acmes in your mill.

Missouri Lamp & Mfg. Co.

ST. LOUIS, MO.

Collars, ties, beads, arms, soap and ropes are some of the things which may be put around necks.

When arms are put around one neck it may be because another neck wants a string of beads put around it. Married necks soon learn to tell when arms are put around them for the purpose of stringing them.

Collars are put around men's necks so that the neck will be uncomfortably aware of its existence. A stiff collar prevents the neck from holding the head at half mast. In medieval days men wore a ruff on their necks, but these were discarded as soon as it was discovered that stiff collars were just as rough on their necks. Man evidently has an inherent desire to be a rough-neck.

A tie is put around a neck to give it a holiday aspect, just as buildings are decorated with bunting during old home week. No one knows why gentlemen wear them, for a nude gentleman's neck, that is to say, a gentleman's nude neck could not be more ungainly than some of the atrocious ties which are put around it. Women bear the brunt of Style's torture at their waists, but men get it in the neck.

A woman's collar is sometimes put around her neck and sometimes dwells in an entirely different neighborhood. When a woman's collar is not acquainted with her neck, it is said to be cut low in the neck. This is a chaste way of referring to other parts of her anatomy. Conversation thus covers up certain parts of the body which are not protected by clothes. Some female collars might more appropriately be called chest protectors, shoulder straps, suspenders or belts.

Necks have certain pipes in them. Piping engineers who specialize along this line are called anatomists.—*Park's Piping Parables.*

Notes About Men You Know.

(Continued from page 124.)

W. H. JONES, boss carder at Oakland Cotton Mills, Newberry, S. C., for past six years, has accepted a similar position with the Clinton (S. C.) Cotton Mills.

B. M. EVERETT has returned to his former position as overseer of spinning at night at the Anchor Duck Mills, Rome, Ga.

H. A. THACKSTON has been promoted to overseer of weaving at the Ella Mfg. Co., Shelby, N. C., succeeding J. C. Bowling, deceased.

H. M. CHILDERS has changed from overseer of carding, Dudley Shoals Cotton Mills, Granite Falls, N. C., and accepted position as overseer of carding at Pinkney Mill, Gastonia.

R. L. HOWE has resigned as overseer of carding at the Warren Mfg. Co., Warrenville, S. C., to accept a similar position with the Glenn-Lowry Mills, Whitmire, S. C.

OSCAR H. DILLARD from Covington Mills, Covington, Ga., has become overseer of weaving at the Mary-Leila Cotton Mills, Greensboro, Ga.

J. R. MANLY has resigned his position with the Victor-Monaghan Mills, Seneca, S. C., to accept a position as overseer of carding at the Mills Mfg. Co., Greenville, S. C.

D. W. Stimson, who was formerly in charge of spinning at the Orswell Mill, Fitchburg, Mass., is now overseer of ring spinning for the Suncook (N. H.) Manufacturing Co.

W. D. LAWSON, overseer of carding at the Edenton (N. C.) Mills, has been transferred to position of overseer of spinning at the same mill.

The Advertising Contest

Because of the late date on which the November number of COTTON reached the readers, no prize offer will be made on the December number. Instead of this, an extension of time of one month will be allowed on the November contest and all contest letters on the November issue received on or before January 1st, 1918, will be considered.

This is one time that the judges disagree. Because of this disagreement two of the prize gauges will be distributed in the October contest. One of these has gone to H. H. Baker, Overseer of Spinning, Griffin Manufacturing Co., Griffin, Ga. The other has been delivered to Edw. M. Henley, Assistant Manager, Erwin Cotton Mills Co., No. 2 Mills, Duke, N. C. The winning letters follow:

Griffin, Ga., October 16, 1917.

EDITOR COTTON:
Atlanta, Ga.

Dear Sir: Having watched with much interest the results of your "Best Advertisement" contests, have waited to send in my effort until the one best advertisement appeared.

That one appears in the current issue of COTTON and there are eight excellent reasons why it is the best.

When a man is satisfied for his customers to write an advertisement for him that costs him money to print, it is a safe bet that he is delivering the goods.

The Valley Waste Mills, La Grange, Ga., have done just that thing in the eight letters appearing in their advertisement.

Yours very truly,
(Signed) H. H. Baker, Overseer of Spinning,
Griffin Manufacturing Co.

Duke, N. C., October 15, 1917.

EDITOR COTTON:
Atlanta, Ga.

Dear Sir: Having just looked over all the advertisements in your October number of COTTON and carefully considered each, it seems to me that of the American Laundry Machinery Co. is the best in the entire issue, and my reasons for thinking so are as follows:

(1) "Are you wasting $144.00 a week?" This is certainly a very attractive heading, and compels one to read on. It is especially attractive at this time, when we are being taught daily to economize, that we may successfully meet present conditions, and come out victorious in the greatest war in the history of the world.

(2) In the first sentence we find: "The work is done quicker, better and more uniformly", which means a better quality and an increased production at a lower cost, conditions which manufacturers are striving harder to attain than ever before.

(3) "Do you know how much this press would save in your mill; not only in dollars, but in operatives also?" This is especially interesting at this time, when one of the most serious problems confronting the manufacturer is how to obtain and hold enough help to keep his machinery running to full capacity.

(4) We find it is no trouble and costs nothing to learn all about this proposition, all that is necessary is to write to the nearest representative.

(5) A forcibly and attractively written advertisement, one not too long to hold the attention of the reader, and not too short to express all that is necessary.

Yours very truly,
(Signed) Edward M. Henley, Asst. Manager,
Erwin Cotton Mills Co., No. 2 Mills.

Griffin, Ga., Nov. 7, 1917.

Mr. L. L. ARNOLD,
Atlanta, Ga.

Dear Mr. Arnold: 'Tis with pleasure I acknowledge receipt of the gage, also your letter of the 5th. I thank you for both.

Will be glad to co-operate with you in your Practical Discussion Department. I always read this section of COTTON with close attention.

Again thanking you, I am,

Yours very truly,
(Signed) H. H. Baker.

Duke, N. C., November 15, 1917.

EDITOR COTTON:

The prize gauge was delayed in reaching me. However, I have received it and it is a beauty and I consider it a very valuable instrument. I thank you very much.

I have referred the question on Carding to our superintendent, Mr. J. W. Cates, who is a very practical carder, and I think you will hear from him in a short while.

Yours very truly,
(Signed) E. M. Henley.

Finishing and Shrinking Denims and Khaki Goods and the Waterproofing of Khakis.

(Continued from page 118)

very desirable in all cases where waterproofing by means of alumina is used.

(2) Another method of depositing the colloid stearate of the metallic oxides upon the goods is to precipitate a solution of soap with a metallic salt such as sulphate of alumina, iron, or copper. The resulting precipitate of the stearate of the metal is washed and dried and then redissolved in some hydro carbon, after which the goods are run slowly through it. If benzine, bisulphide of carbon, or tetrachloride of carbon are used, they may be recovered and used over again, while the resulting stearate is deposited on the fabric. If alumina be used as a base, stearate of alumina will be deposited the same as in the previous receipt (1) but the waterproofing,— if properly carried out,—will be more effective.

(3) Another process is to steep the fabric by boiling it for a few hours in a mixture of soap, glue, and water, and expose it to the air until nearly dry—in other words to hang it up in an open ageing room to age. It is then digested for about 10 hours in a strong solution of equal parts of common salt and alum; washed well and dried at a low temperature of not over 80 degrees F. This is also a colloid stearate process, but it derives its efficacy especially from the length of time taken in the process, which enables the different ingredients to become thoroughly and firmly incorporated with the fabric; also the low temperature of the final drying process is an important factor.

The following is a good process for tarpaulins, wagon and horse covers, etc., if the goods are made of fairly closely woven material:

(4) Thoroughly soak 30 pounds of casein in a suitable vessel overnight, the next morning add sufficient ammonia to the mixture to make it soluble; then add 15 pounds of pure tallow soap in solution, bringing the total quantity up to about 50 gallons; heat, but do not boil, as boiling will drive out the ammonia and deposit the casein. Pad the goods thoroughly in this mixture, running twice through. Dry up and age on an ageing machine in formalin vapor. Then steep the goods thoroughly 12 hours in acetate of alumina at 7 degrees Tw., wash and dry at a cool temperature, preferably in the open air or drying room. Or, after the run in acetate, the goods may be dried up as cool as possible on the drying cylinders or tentering frame and then brought back and soaped, washed and dried up. This is a very efficacious process and comes as near to an absolute waterproof as can be got at. It is also a colloid process, but so far as is known, the best one discovered yet.

There are other processes involving mixtures of glue, albumin, tannin, ammonium cuprate, cellulose, paraffin, etc., all of which are colloid processes and which possess no special merit over those given. There is also the alkali-cellulose-xanthate process which is a good one but almost too complicated to interest the readers even if I had the space at my disposal to discuss it.

Don't get the idea that team work means tandem—with the high stepper in front.

If you have a talent for criticism don't overlook yourself.

The Humidifier With a Guarantee.

The Turbo-humidifier is the outcome of long experience with the problems and needs of humidification, coupled with a growing dissatisfaction with existing methods. Its inventor, Albert W. Thompson, was then the mechanical superintendent of the Amoskeag Manufacturing Company with an excellent technical training and long mill practice. His observations showed him that at that time no suitable humidifying apparatus was available for every condition to be found in the different mills of the country and he then set out to attain a device that would not only do the work desired in one mill, but would be adaptable to all mills. In other words, he was endeavoring to design a humidifier that would do away with as many of the objectionable features as possible.

The Turbo-humidifier principle should not be confused with either the injector or the atomizer principle. In the atomizer principle, air is blown from one orifice across another, which is a water port. Humidifiers built after this manner are claimed to be less efficient inasmuch as the operating orifices being exposed, are much more likely to catch dirt or lint.

The centrifugal motion imparted to the air by the Turbo principle, actually pulverizes the water before it is delivered to the atmosphere. This actually spreads the vapor and distributes it before condensation can occur and since vapor follows the law of gases, it defuses itself throughout an enclosure, no fans or other artificial means being necessary for its distribution.

The claims made for the turbo-humidifier system is that it maintains a suitable degree of humidity at all seasons and in all parts of the mill with the least possible trouble; the degree of humidity may be varied at will in any section or at any head without interference with adjustments; it cannot overflow and thus cause damage to stock or machinery; it will effectively cool the air of the rooms and will act as a preventive of dust, soot and lint; it is small and never in the way and may be used in the lowest studded room where it will not prove objectionable.

Another special feature about the Turbo, is that it has no sheet metal parts to catch dust, no drain pipes to clog, no motors, fans or other moving parts and no cumbersome strainers, cloths, receiving tanks or similar propositions that it is necessary to keep clean. It is an instrument, not an apparatus. Furthermore, the use of the Turbo-humidifier allows the use of compressed air cleaning practically without additional cost. The instrument is manufactured by the G. M. Parks Company, of Fitchburg, Mass., who will be glad to furnish further information upon inquiry.

The Bond Foundry and Machine Co., of Manheim, Pa., announce that they recently purchased, as a going concern, the property, plant and goodwill of the Queen City Foundry Company, Toronto, Canada. In the future the plant will be operated as the Bond Engineering Works, Limited. The new company will continue to manufacture grey iron castings for the trade, and in addition will make a line of power transmitting specialties, consisting of shaft hangers, couplings, collars, etc. Additional new buildings will be erected to take care of the increased business. The new works will be under the management of H. M. Lee, who is thoroughly experienced in this line.

KNITTING SECTION

TO MEET COMPETITION

You must be equipped with the

Most Modern Machinery and Most Economical Methods

Can you *afford* to transfer half hose tops by *hand* in the *day-time only* when by using our

MODEL K-G MACHINE

this *Expensive Labor* may be *saved* and the machines run *24 hours*, thus more than

Doubling Production

ESTABLISHED 1865

Scott & Williams

INCORPORATED

366 Broadway, NEW YORK

MERCERIZED YARNS

Dyers—Bleachers—Gassers

Dyers of

Colors Fast to SUN and BLEACHING

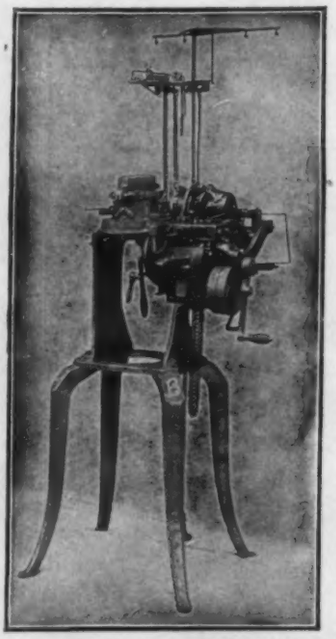
ABERFOYLE
Manufacturing Company

CHESTER, PA.

402 Morris Building
PHILADELPHIA

CHICAGO
746 Insurance Exchange

BOSS FULL AUTOMATIC KNITTER



It will make the neatest, most uniform and most perfect work, and is the most profitable of any knitter on the market.

It has the simplest Automatic Splicer in the world and never causes trouble. All parts are interchangeable. Compact and strongly built. Runs easily and breaks very few needles, seldom if ever requiring repairs.

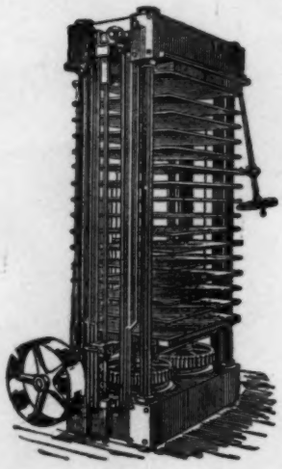
So simple that an unskilled operator can learn to run it in a day.

The Boss Knitter means more production for the money than any other machine. Investigate.

Send for Particulars

BOSS KNITTING MACHINE WORKS

Cor. Elm and Reed Sts. **READING, PA.**



RELIANCE

Hot Plate Screw Press
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A Knit Goods Export Exhibit

Added interest in knit goods export trade developed at a meeting of the Schuylkill Valley Division of the National Association of Hosiery and Underwear Manufacturers, in Reading, Pa., on November 10, when the following from the Commerce Reports of November 5th, of the Bureau of Foreign and Domestic Commerce was submitted:

The Pennsylvania division of the National Association of Hosiery and Underwear Manufacturers, at a meeting on October 13, adopted a resolution that places its unqualified condemnation on the practice of a few manufacturers who have been guilty of unfair and fraudulent practices on the merchants of South America. The text of the resolution states:

Resolved, That the Pennsylvania division of the National Association of Hosiery and Underwear Manufacturers unqualifiedly condemn as most reprehensible, and calculated to discredit American manufacturers in the market of the world, the practice of a few manufacturers, as revealed by irrefutable evidence, of foisting unworthy merchandise on the merchants of South America. And we would urge the taking of such steps as may be deemed expedient for safeguarding the interests of the great body of American manufacturers who, we know, are in accord with the sentiments herein expressed.

The Bureau of Foreign and Domestic Commerce fully approves this action of the hosiery and underwear manufacturers and commends it to the attention of other organizations. Because of the delinquency of the few, the entire business public of this country may come under suspicion, and it is the duty of the trade associations to see that their membership live up to the high standards of business practice that they have adopted. If foreign buyers are convinced that in dealing with members of representative trade associations in the United States they can be assured of the full support of those associations in the settlement of any disputes that may arise, with individual members, a confidence in American business methods will be established that will be a large factor in the extension of our foreign trade.

The action taken at the October meeting was approved, and it was voted unanimously to co-operate with the Department of Commerce and the Executive Board of the National Association of hosiery and Underwear Manufacturers in investigating charges of unfair methods. The meeting also favored the expulsion of members of the Association proved guilty of improper practices.

In a letter dealing with "careless practices of certain hosiery exporters in the South American trade" the Department of Commerce says:

This Bureau has on various occasions received complaints from Latin American importers regarding such practices, and we have regretted that the hosiery trade seems to have been the cause of more unfavorable comments than any other single line. It has been very gratifying to note, however, that such specific offenses as have been called to the attention of various firms have been promptly and favorably acted upon.

Contributing to the interest shown in foreign trade was the announcement that at the Association's exhibition in Philadelphia in May, 1918, opportunity would be given for exhibiting specimens of the products of United States manufacturers of knit goods desirous of selling in foreign markets or promoting more friendly relations with domestic buyers. It was regarded as important that the proposed exhibit receive the widest possible support, even though mills are not in position at that time to accept additional business. Although a manufacturer might be sold up and not desirous of taking further orders, it was pointed out, the buying public would be interested in a close inspection of the products of competing mills.

It was suggested that, with a view to establishing certain standards for knit goods intended for export—standards conforming to the ideas of the various countries—it might be a good idea to establish in each textile centre a central finishing plant. In this way, it was thought, manufacturers would gradually be brought to a better understanding of the desires of foreign buyers as to the type and finish of knit goods. No action was taken on the subject, but as it was seriously brought to the attention of previous meetings it was believed by some manufacturers that the day of central finishing plants was not far distant, particularly as it would offer one means of meeting a condition frequently brought about by arbitrary labor leaders.

On behalf of Pennsylvania manufacturers of knit goods the National Association of Hosiery and Underwear Manufacturers was authorized to communicate with government authorities a request that provision be made for mill inspection of knitted goods for the army and navy. Much time could be saved by inspecting government purchases in mills, it was thought, and there would be less delay in deliveries, while manufacturers would not be subjected to carrying charges on rejected goods.

The meeting was in hearty sympathy with the proposition originating in Philadelphia for co-operation between industrial plants and the schools to permit part time labo by pupils, for either of the following objects:

"Distinctly educational training for boys desirous to become highly skilled operatives."

"Furnishing pupils an opportunity to earn money in industry to enable them to remain in school."

"Affording additional help from schools to meet the extraordinary demands for labor."

During an interchange of thought on the cotton yarn market, it developed that shipments were being seriously delayed by rail embargoes and congested freight conditions generally. From four to eight weeks frequently is consumed in getting shipments of yarn from Southern spinners, it was stated. The suggestion of one leading manufacturer was that mills should carry surplus stocks of yarns for meeting the transportation difficulties.

A number of those present, it was brought out, are working up yarns purchased at about one-half the replacement value. No one who ventured an opinion believed lower yarn prices would come for some time, even though cotton were to go off several cents a pound.

Hosiery manufacturers all reported all the business they could handle and regarded it unwise to sell for more than a few months deliveries. Several half hose mills are accumulating some little stock where possible to do so, believing operating costs will increase faster than the shortage among jobbers can be relieved. One mill is selling 176 needle one pound socks, from 16's double carded yarn at $1.40, one per cent 10 days, 30 days net, f. o. b. mill, and 144 needle 18 ounce goods from 12's carded, at $1.25, same terms, both for immediate spring.

Underwear mills have an opening for additional business. All are maintaining prices, which may advance by the time buyers come into the market for either initial or dup-

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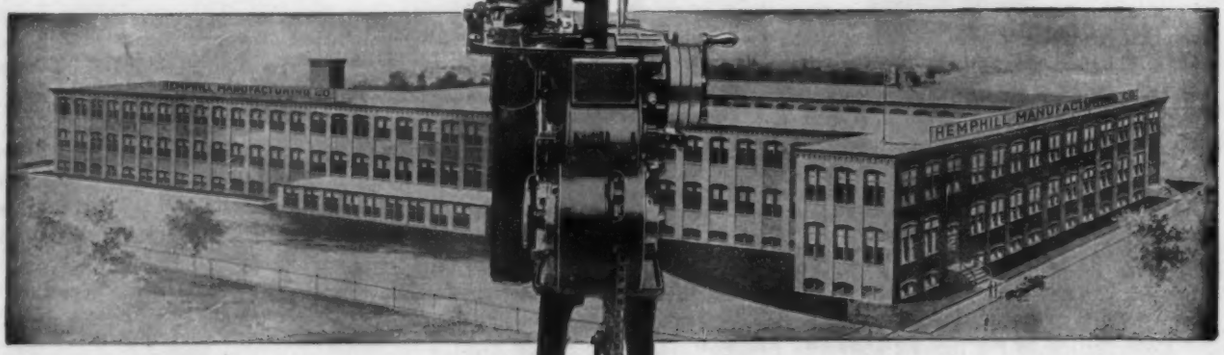

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licate orders. It is known to manufacturers that a number of jobbers have not purchased for their spring requirements and that there is very little light weight underwear in warehouses. They therefore are giving no attention to offerings of business under market values, which seem certain to increase.

The Knit Goods Market.

Hosiery has not been having a brisk sale in the primary market, according to reports from a number of Philadelphia mills making seamless goods. Mills, however, have sufficient business on their books to carry them well into next year, and in a way there is the activity of a normal or even a boom market. Buying is slow only in contrast with conditions in the last year or more, a period in which merchandising was more a matter of having goods to sell than finding merchants to whom to sell such goods.

The only discordant note in the trade as found among manufacturers is the absence of that keen interest in spring goods which should be manifest. It is apparent that jobbers will be in no hurry to commit themselves for full requirements so long as the complex excess profits tax law continue to puzzle financiers. Jobbers admit they will require more hosiery by the time normal orders are received from the retail houses, but they would rather pay the inevitably higher prices and pass it along than assume the minimum of risk involved in the war developments.

There are well authenticated incidents for showing that questions involved in the war tax have retarded buying. Between now and January 1st the stock of every manufacturer and merchant must be inventoried to arrive at a basis for computing the tax. It will be the most sweeping and exhaustive stock-taking ever conducted.

In preparation for the inventory, stocks may be expected to be so shifted or manipulated as to leave to others the glory of the larger excess profits. Merchandise at the prices of today would be worth more in mid-December than the equivalent of the purchase in bank. To inventory it below the then market value might create suspicion. To enter it at its worth would represent a greater profit than had been earned.

As indicating that transactions are being conducted on a basis for escaping a show of profits not actually earned is indicated in sales by several mills in early November for delivery after January 1st. The buyers discounting their bills in ten days from date of order. In these cases the buyer will have neither the cash nor merchandise. The mill will have the latter, but it may be only in process of manufacture or still to be manufactured at the time of inventory.

But excess profits play no part in transactions involving half hose. Socks continue scarce, one of the scarcest items in hosiery, and coarse gauge goods, are in the greatest demand. For several weeks there have been standing offers from New York commission houses and forwarders for lots of 10,000 to 20,000 dozens of 144 needle half hose, at $1.10 for sewed toe goods, which normally sell five cents under those with looped toe. A leading manufacturer has advanced his 144 needle looped toe socks to $1.25, having sold up to April at $1.15 to $1.20. This would appear to make the sewed toe socks worth $1.15 at the lowest, a staggering price, but more likely to go five cents higher than that much lower. These figures might be calculated to halt brisk buying for a time, but as mills are sold well ahead, the market still is in the manufacturer's favor.

There is fear, however, that the turning over of much machinery from women's cotton hose to escape the transfer work, will work toward a surplus of half hose. For weeks women's cheap stockings have been a drag. Even ridiculously low prices that were quoted as a feeler failed to tempt buyers.

Mills, notably a number in the South, which went out early with spring prices, took bumper business from the start, often at better prices than since have been quoted in some quarters. Jobbers had made up their minds as to how much they would buy for spring, and seem determined to adhere to the policy of staying out of the market for the remainder until next year.

This is one explanation of the lack of interest in women's cotton hose. Manufacturers who opened late for spring got little of the cream of the business. Prices have remained firm, and holders probably will be repaid for their pateince, for at current prices of yarn and prevailing wage scales, the goods could not be put on the market at figures acceptable to the trade.

There are exceptions, of course. A manufacturer recently diverted a lot of machinery to women's 176 needle looped toe goods, from 30's carded yarn, and tried them out at $1.25 a dozen. They were snapped up at a rate that led him to believe the goods had been priced too low. Sales continued in good volume after the price had been moved up to $1.35. The manufacturer admits that the difference between what he got and what he might have gotten for all that were sold, amounts to $12,500, and says he was deceived by the inactivity in women's cotton lines generally.

The best picking this fall for spring business has been in ladies' full fashioned silks and mercerized. Most mills on these lines simply allotted production among customers on the basis of last year's business. In selling to April, few fashion mills gave customers more than 50 per cent of what they wanted. In one instance orders were sealed 75 per cent, the mill being far behind in deliveries. Silks are in such great demand that some mills are producing on a more extensive scale than ever, at the same time curtailing their output of mercerized.

Manufacturers are in accord in the view that in the higher priced staples cost is not going to check buying; that economy will be in other directions. Supporting this belief is the fact that the distributing trade is eager for silk sweater coats, while in the artificial silk garments, less interest is being shown. This may be ascribed to the very high price of artificial silk yarn, which brings the cost of a garment of this material up to so near that of Japan silk that most persons would be inclined to give preference to the latter.

Artificial silk boot hosiery for women, however, is one of the most wanted knitted lines.

A house buying for a London distributor is in the market for 20,000 dozens of 13 inch and 17 inch silk boot goods. The export market for cheap cotton lines is just the reverse.

The drop in exports was a factor in the accumulation of stocks of women's seamless hosiery, and overseas trade is not likely to improve under present government regulations for the shutting off of supplies to neutral countries assumed

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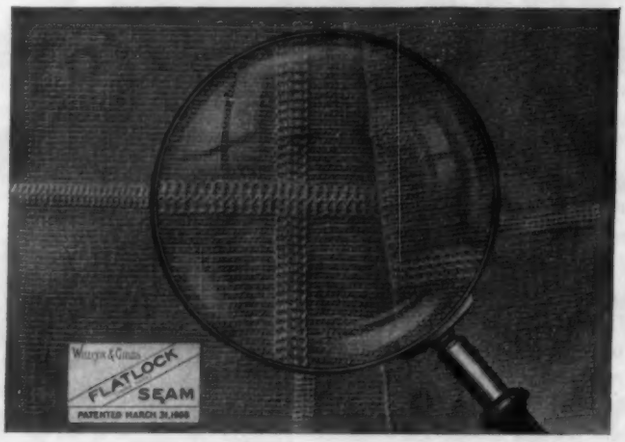

THE elimination of some operations hitherto found necessary in the manufacture of knit underwear means lower operating cost and quicker production, and it is for this reason that many prominent knit underwear manufacturers have adopted the *Flatlock* Machine for seaming.

The Flatlock Machine makes the strongest, most durable, most sightly seam that can be used to seam knit underwear. The Flatlock Seam comes from the machine *complete*, saving the cost and delay of the additional covering operation heretofore deemed necessary.

We are featuring the Seam and the Trademark, shown above, to the big retailers of the country. We are driving home, month after month, the doctrine that Flatlock is

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The Flatlock Seam is a selling point for the retailer to use. We are showing him how he can use it to increase sales. If you use the Flatlock Seam in the knit underwear you manufacture it is an added reason why the retailer should buy your goods.

Nearly 200 manufacturers in the United States, Great Britain, Canada and elsewhere are using the "Flatlock" Seam because it makes more salable undergarments. A majority of these mills in the United States are filling Government contracts for underwear for our troops at the front and in training camps and also for our sailors on the Atlantic coast and abroad. The Government specifications mention the Flatlock Seam.

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to be trading with the Central Allies. This is a phase of the situation that should not be lost sight of in selling for next year, for it is a certainty that any great surplus in mill warehouses will be regarded by unscrupulous merchants as offering an opportunity for repudiating orders.

Yarn merchants report knitting mills as buying very conservatively, and some houses recommend that yarns be bought only as sold. It is regarded as beyond question that if mills will adhere to such a policy, there would be little difficulty in maintaining prices during any temporary slump in cotton that might occur, as the result of manipulation or disturbing war rumors.

As the situation stands, there will be no surplus of hosiery for next year. Notwithstanding additions to equipment and new mills that are springing up at the rate of one or more a week.

Under the present method of buying war hosiery, the public is not being informed of the quantities that are being taken. It is known, however, that many mills are defaulting in civilian deliveries because of the pressure on them for socks for soldiers, and some have received the intimation that they will be expected to supply still more than those which have been contracted for.

Wool hosiery for fall, 1918, will be in very scant supply. One very large concern has pledged to the quartermaster's department its production until next September, and a representative of the mill says the government shall have more if wanted. Normally this mill starts in January on its fall business, so that next year at least 75 per cent of its production will be directed from civilian channels. Doubtless it is knowledge of next year's shortage of wool hosiery that is encouraging the investment of capital in plants for turning off cotton hosiery.

The supreme struggle of manufacturers to serve both the government and their civilian customers is among those making heavy-weight underwear. It is commonly understood in the trade that far more shirts and drawers than ever was contemplated will be required. It is stated that the quartermaster's deparment was not prepared to properly clothe all the troops that it was intended should be under training at this time. The unusual pressure on mills is inspired by the determination to have ample supplies by the time the men called in the second draft are sent to the training camps.

The prospect for very large government orders running well into next year is responsible for considerable hesitancy among mills about opening for fall, 1918. Some manufacturers favored naming no prices until the middle of December or January 1st, and it is likely a number of lines will not be shown before the early weeks of 1918.

Two Southern mills manufacturing heavy cotton union suits and single garments have been selling for next fall for some weeks, and are reported having booked considerable business at fair prices, but under what could be obtained now. It is stated that this is but a repetition of what occurred a year ago when these mills went out for the current season.

Many hosiery manufacturers have regretted that a year ago they accepted about everything that came along in the way of a sizeable order showing an unusual profit. Some of these mills are still delivering hosiery at last year's prices, and in order to share in the vastly more profitable business of this year have added much equipment. A well known Pennsylvania mill which recently has been getting one dollar per dozen more for ladies' hosiery than is being received by the same mill for the same line being delivered at last year's price. Instances of this kind are common, and afford an explanation for the disinclination of most mills to sell beyond next April, and then for only known good accounts.

The credit of small merchants subject to conscription is being looked into very closely following the experience of several mills with a customer who had fallen in arrears. Finally when pressed for settlement he wrote: "Have been drafted; not exempt. Business has been sold out, can offer 25 cents on the dollar."

Creditors would be loath to take drastic action against a delinquent customer who had been called to the military service and therefor are disposed to act in advance of the draft.

Collection agencies specializing in knit goods accounts and credit men in the offices of the larger mills report collections very satisfactory in the main. One concern handling such accounts removed 111 names from its list of past due accounts in the quarter ending November 15 and added 65, leaving a net gain of 46. It is noteworthy that with sellers scanning credits more closely and exercising greater care in the selection of accounts many merchants who hitherto were rated "slow" are meeting their obligations more promptly.

This is one indication of the fundamental soundness of the knit goods trade and the favorable position of mills. Another is the fact that during the recent days when securities were dropping to new low levels on the stock exchange the hosiery and underwear market suffered no unusual disturbance. Buying for spring has not been as heavy as normally, but that is due more to the prevailing spirit of conservatism among mills and merchants.

There is every reason for believing that, with two Liberty Loans out of the way and the excess profits tax questions disposed of, renewed activity will set in early in the next year, and that the then buyers will realize that conservatism was a costly safeguard, as all interests, from spinner to jobber, agree that the price apex is yet to be crossed.

Woman's Work in War Time.

"Woman's Work in War Time" is the title of a booklet by W. Irving Bullard, Manager of the Textile Department of the Merchants National Bank of Boston.

The extent to which women have entered into industrial work that was formerly performed by men only, particularly in the countries across the sea, has given Mr. Bullard the incentive to prepare a work that will be read with great interest by American manufacturers in all classes.

Among other things the book contains a series of subchapters which give a brief outline of the operations in the industries in Great Britain where women have replaced men and have taken upon themselves the economic and industrial welfare of the country. These suggestions will attract the attention of many manufacturers who are today having difficulty in securing a sufficient quantity of reliable male help to operate their factories. A copy may no doubt be secured upon application to the Merchants National Bank of Boston, 28 State Street, Boston, Mass.

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Warp Loom Fabrics.

BY WILLIAM DAVIS, M.A.

There is probably no member of the textile family so imperfectly understood as the warp-loom fabric and there are few fabrics which have a future so full of promise. If a question on the subject be put to many engaged in the knit goods trade, they would probably reply that they had not heard of it before, or answer by referring to the woven product as it is known in the ordinary textile operation.

This ignorance is astounding in view of the fact that warp loom products are sold in nearly every clothier's or draper's shop and are much prized on account of their special qualities. The explanation is probably that the industry has for the most part been confined to Saxony, the town of Apolda being the chief centre for the manufacture of warp loom machinery. In this district it has been given specialized attention during the past 25 years, the foundation being laid in a cleverly devised hand-loom which even in its primitive state gave a wonderful variety of patterns and color schemes.

When the hand warp-loom was supplanted by the power form of the machine, the development of the possibilities of the mechanism was the subject of close attention given by the Saxon machine builders and their factories gradually established a hold on the industry which has increased to enormous dimensions. Now that the supplies of both machines and fabrics have been interrupted and the merchants find that articles usually forming part of their general stock are missing, fuller inquiries as to the nature and origin of the trade are naturally made. To answer some of these questions and demonstrate the possibilities of this hitherto neglected branch of the textile industry is the purpose of this sketch.

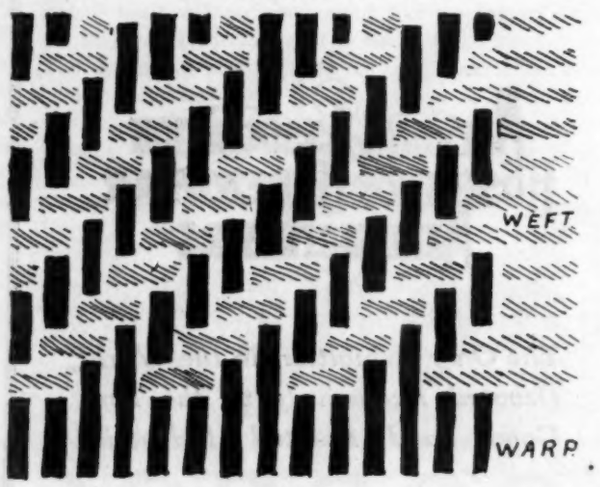
The position of the warp-loom as a member of the textile family in intensely interesting and to appreciate its connection we require to glance at the woven fabric on the one hand and the knitted fabric on the other. By the term woven product is meant that structure which is built by preparing a warp consisting of a large number of threads all arranged the same length and parallel to each other on the weaver's beam. The formation of the texture arises from the action of the shuttle which crosses the lay of the loom and deposits its thread in the division formed by the warp yarns. The actual cloth is made when the reed presses this pick or shoot of weft into the cloth, the pressure being exerted by the forward movement

In the ordinary plain knitted fabric as usually understood, the entire structure is formed from one thread, this being intersected on itself in the shape of loops. These loops are produced in horizontal rows and as one row is completed, it is discharged and a fresh row formed from the new piece of thread. This mutual interdependence of loops forms the basis of that elasticity and stretch of the knitted cloth and which renders it peculiarly suited for garments which have to be worn next to the skin. The texture is such as to induce maximum comfort as the elasticity enables the fabric to yield to the movement of the body.

The woven texture on account of the intimate way in which the warp yarns are caused to intersect those of the weft is altogether more firmly built, the threads of warp and weft cross and recross each other at short intervals and so establish a mutual hold which forms a basis of the well-known consistency of its texture. On account of this very vigorous property, the fabric is highly suited for garments which have to be worn outside, and where the properties of wear and tear are more directly useful.

PROPERTIES OF WARP LOOM FABRIC.

If we outline the properties and capacity of the fabric produced on the warp loom we shall be in a position to appreciate the reasons which have placed in it its present useful position as a medium of textile manufacture. Structurally the fabric has a warp made up of threads arranged on a beam exactly as in the weaving loom; at this juncture however the analogy breaks down and the complete definition must be made with reference to the knitted structure. These warp threads are each placed through the eye of a guide point, these points being so arranged in a bar actuated from the side so that they can be used to lay their yarns over the needles.



A WOVEN FABRIC.

When these threads have been so placed on the needles, the stitch formation can proceed, and the course of loops is completed in exactly the same fashion as the ordinary knitting machine, where the new yarn is drawn through the old stitch and the course discharged over the needle ends. From this outline, it will be readily understood that the warp-loom fabric has some of the qualities of the knitted structure and some of the qualities of the woven cloth. In point of elasticity it comes exactly between these two varieties, it is not so rigid as the woven, nor so elastic as the knitted structure. The latter fabric displays about twice the elasticity in the width to what we have in the length but the warp loom is much more rigid than the knitted fabric, especially in the direction of the length where it exhibits considerable strength. In the width the stretch is much more pronounced than in the length, but this depends a great deal on the character of the texture. In the warp loom product it is possible to obtain a wide diversity of textures as the rigorous sequence of loops as shown in the knitted cloth is wholly unnecessary. It is the style of structure "par excellence" for fabrics intended to give a light and airy aspect. Moreover the colors can be much more lavishly employed than is the case of the knitted structure and there is also much greater freedom of fabric structure than is the case with the woven product. By the use of several guide bars, it is feasible to employ several styles of warp threads, one set thick and woolly, another fine and dense,

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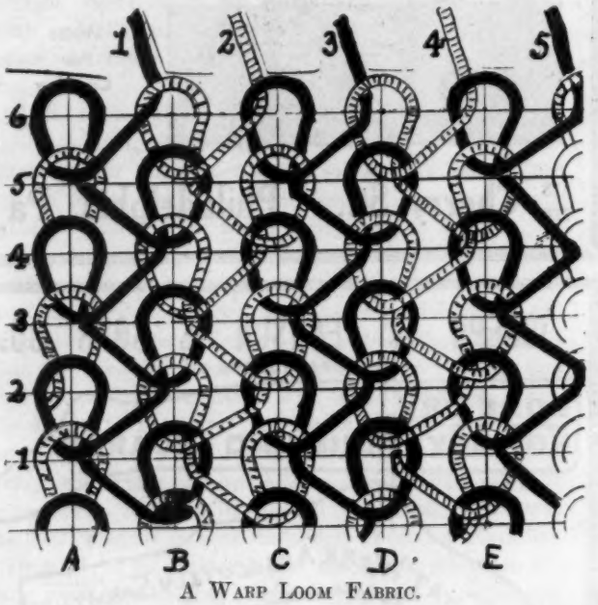
whilst another series can be introduced exactly at specific points in the width so as to form centres or borders to the article. This lends itself to the making of bold effects produced by masses of floating yarn. Seeing that each thread is separate from its neighbor in the warp, each can be a different color if needs be and this will give a conception of the immense scope allowed to the colorist.

An examination of the accompanying diagrams will bear out more clearly the different points which have just been enumerated. Fig. 1 shows a view of the woven structure where the threads in the vertical direction represent the warp, whilst those running crosswise represent the weft. These two sets of yarns are noticed to intersect to form a twill which runs in the direction of the right. From the intimate character of the intersection of the two sets as they cross over and under each other it is easy to trace the source of the admitted strength and rigidity of the resulting texture. Fig. 3 will be recognized as that of the plain knitted fabric where the threads inserted crosswise intersect closely loop on loop all the way across. This point also illustrates the inherent weakness of the knitted texture for



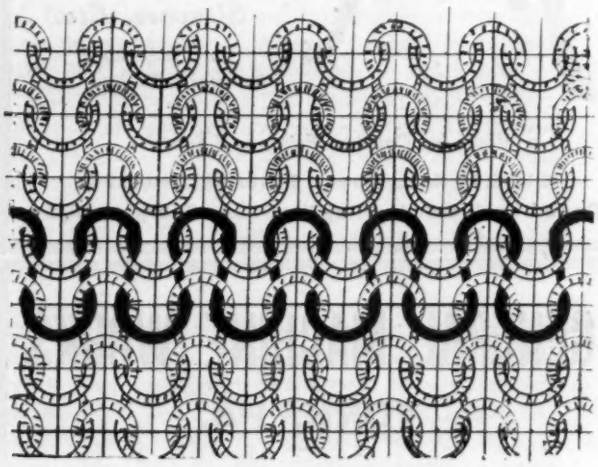
A WARP LOOM FABRIC.

if this thread gives way at any place all the loops hanging on it lose their support and the whole fabric in that region becomes thoroughly disorganized. Further if it is desired to unravel the fabric, you have only to secure the free end and dint of pulling, and the whole structure may be reduced to nothing in a short time. This has its advantages in respect of saving waste material, for if a length of fabric is spoiled, it can be unravelled and utilized once more.

In the case of the woven structure this is not possible in the same way because the weft threads would require to be extracted individually and it would be difficult to obtain a continuous length owing to the warp which hampers the unravelling operation. For the knitted structure makers of knit goods find it profitable to have special operatives whose duty it is unravel and rewind yarn obtained from pieces of spoiled fabric and of parts of garments which for some reason or other have been rejected.

Fig. 2 is an illustration of the simplest form of warp loom fabric. The threads in this case have been colored to represent one thread grey and one thread black and if any one of these threads be traced from top to bottom of the sketch, a clear idea of the style of intersection can be obtained. The way in which any thread changes its position at each course is quite characteristic, the upper part of the loop is perfectly formed but the lower part is obliged to execute a crosswise movement to reach its neighboring needle, this reach taking place to the right and then to the left alternately. This crossing of the threads all through the structure forms the best means of detecting the fabric in cases of doubt and another test is to attempt to unravel the structure which is practically impossible. If one takes the warp threads hanging loosely at the top the most one can do is to straighten the loops for several courses, but the fabric itself will not come apart like the knitted structure. In this way if breakage of a warp thread results, the effect is confined practically to the spot where it has occurred and the tendency for it to extend is not so great. It is, of course, an entirely different matter if a thread of warp is missing for any length of cloth, as this at once gives rise to an obviously serious imperfection.

If one is in doubt whether a given cloth is knitted or made on the warp loom, one only requires to pull at the



A KNITTED FABRIC.

end when in the case of the warp loom stuff you will seize several separate threads, whilst if it is knitted you will only obtain hold of one thread. This simple test may be found of great service in cases of doubt for when the warp loom fabric is met with, it is often wrongly described as a knitted structure, or misunderstood altogether. With little practice, one can distingush the features of the warp loom fabric at sight. At the top of Fig. 2 several of the threads of the fabric have been drawn out longer whilst the rows of stitches have been marked in a vertical direction by the capitals *A B C D* and *E*. If thread *1* be examined, it will be noticed that its loop cannot be unravelled farther than about the third course where it becomes caught in the stitches of thread *2*. Let the travels of the black thread *1* be traced through succeeding courses and a very regular motion will be noted. The loops comprising the vertical row *A* are made on a needle which may also be called *A* and so on for the stitches of *B C D* and *E*. Tracing courses *1* to *6* we have the black thread *1* lying on needle *B* at the first course and at the second course this thread has been transferred to needle *A* on the left. For the third course, the thread has again been replaced on needle *B* but in the *4th* course, it is is found again on needle *A*. Thus the black thread has its

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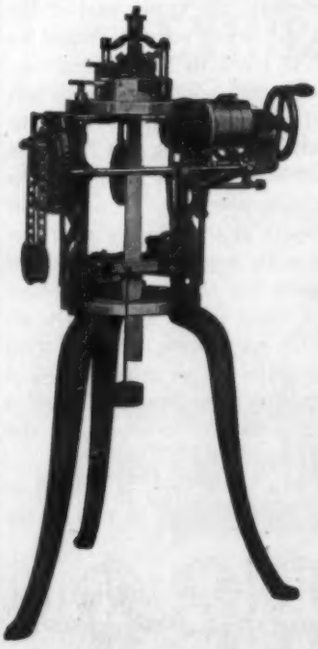

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loop made on needle *B* for one course and at the next has its loop worked on needle *A*, this change taking place alternately. Every loop has one of its "legs" connected with the course above and another with the course below this divergence of direction causing an angle of 90 degrees to be formed at the junction of the two "legs"

It will profit the reader to follow the travels of this thread very carefully for on its thorough understanding hinges the whole study of warp loom fabrics. Let the other threads in the structure be now examined and it will be found that they all follow the same course of loop formation. Grey thread *2* begins its loop in course *1* on needle *C*, in course *2* the loop is found on needle *B*, in course *3* on needle *C* once more and so on alternately throughout the whole structure. These two vertical sets of loops comprise the repeat of the pattern under consideration for the row of loops *C* is identical to that of *A*, row *D* is identical to *B*, and row *E* identical with rows *A* and *C*. In other words, to make course *2* all the threads have been swung one needle space to the left before their loops were formed; this done all the threads receive a similar swing back again to the right and complete their course as before. This swinging movement observable in the warp loom structure is termed the lap and it is of the greatest vital importance in considering patterns which can be produced on this type of frame.

All these threads of the warp *1*, *2* and *3* and so on, are, in this case, arranged on the same beam and the yarns pass through eyes of the guides in the same guide bar. When the guide points used for any design are all found in one bar, they receive the lap which is imparted to this bar. In the present instance is said to be one and one, a lap to the right and a lap back again to the left. The chief bases of pattern orignation will now be clear to the reader and from this simple beginning we can extend the operations so that the bar will travel two courses to the right in successive courses and reversing will travel back again two needle spaces to the left. The repeat of this lap is four courses and the radius of operation comprizes three needles. We can next extend the operation so as to have a lap of four needles to the right in succeeding courses, and reverse to the left. For the type of warp loom under consideration, the lap must be so arranged that there is a return to the starting point, for lapping always in the same direction will cause a certain number of needles to be emptied at the side and if the lap is of more than four courses or so, the edge will show a zig-zag effect in place of being straight.

In a lap of only a few courses this is not serious, but in larger patterns the edge is much indented. If the number of needles lapped to the right were greater than those lapped to the left in any one pattern, then the whole guide bar would gradually travel to the right and an increasing number of needles would be made empty on the left. Thus it is that all patterns from this loom will be of a more or less zig-zag character in the direction of the length and if one bar only is used, a certain degree of similarity will be noticeable in these patterns. To overcome this, machines are now built to accomodate a number of different guide bars and arrangements made to give each of these a different character of motion.

When scrutinizing a warp loom pattern to ascertain how it can be reproduced, one of the first things is to estimate the number of guide bars necessary to make the desired pattern. We next require to draw out the path of motion followed by the bar. In such cases there is usually a fairly simple lap arrangement for the ground work, say a lap of a few courses to the right and to the left alternately, using an ordinary kind of material of suitable strength and consistency. The extra guide bars can be given any kind of movement desired, the yarns being entirely different in point of material and counts. If these are expensive qualities, then it will naturally be desired to have longer laps than one needle space so as to display those qualities more prominently.

PREPARATION.

When the number of guide bars used in the pattern have been fixed along with particulars of the number of threads in the warp and their respective yarn counts, we are able to proceed with the work of preparing the warp. The subject of calculating the particulars for yarns of this character was thoroughly demonstrated in a former series of articles and it is therefore unnecessary to enter into detail here. Suffice it to say, that if the manufacturer hopes to grasp the methods of warp preparation with intelligence, he requires to have a thorough understanding of the manner of calculating to a nice fraction the weight of yarns needed for the various warps, taking into account that these are not necessarily of the same length, but will vary according to the degree of intersection to which they are subjected. Otherwise he may find himself in the uncomfortable position of requiring 200 yards of woven cloth and discover that one of the warps has given out at the length of 197 yards, a proceeding which may involve much waste of time and money. He will also require to know how far his yarns in stock will carry him so as to be able to order more in time to supply the knitter before his supplies run out.

The warping operation for small patterns of only a few yards in length may be carried out on a simple hand apparatus, a few projecting pins over which to hang the warp threads being all that is necessary. If long lengths are wanted such as is usually the case for the trade in bulk, then very careful attention has to be given to the operation of warping. Many firms have a comparatively small number of different textures, a few good standard pattern grounds being kept in stock, the difference being made with warps used for showing the fancy effects more or less on the surface.

Machines have not yet been devised which can produce fashioned garments of the warp loom fabric as is the case with the plain knitted stitch; most of the material is produced on looms which are driven swiftly by power and evolve enormous lengths of the fabric. These can afterwards be cut into almost any article of wear. When one considers the trouble involved in drawing threads through the eyes of the guide of the guide bar it will be understood that the warps should be of as great length as possible so as to reduce the labor of this operation.

Most of the kinds of warping apparatus used in the weaving trade may also be employed for the warp loom fabric with the exception of that used in the plain cotton trade. The warping apparatus as employed for the fancy cotton and woollen branches can be adopted for producing warps for the warp loom. We require a creel or bank on which the bobbins or cheeses of material may be built according to the pattern of the warp and this pattern may be secured by taking what is known as the lease or division

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of threads. In this division the threads are caused to cross each other alternately so that they may each be picked out according to their order in the pattern. This lease is also of the greatest service in insuring regularity of the order of threads on the warp beam, so that they are drawn from it in parallel fashion, there being as little as possible crossing of the threads.

When the bobbins have been arranged in the creel in their pattern order, they are next transferred from the individual cops or bobbins to the surface of a suitable circular drum. These drums vary in size. In some cases they are so large as to take on about seven yards in one turn of their circumference, in other branches of the trade it is preferred to have the drum of smaller circumference, one to two yards being a common length. In comparing the two forms the large drum has the advantage of being able to accomodate a long length of warp with comparatively few layers of yarn. If one turn of the drum rolls on eight yards of warp, then in 24 turns, we should have $8 \times 24 = 192$ yards of warp. To wind on a similar length on the small drum of two yards circumference, 86 revolutions would be required. Now the greater number of revolutions gives rise to an increased thickness of yarn on the drum and when this has risen to more than an inch or so, measures have to be taken to support the warp at the edges, a proceeding which is apt to be troublesome in carrying out. The least error in adjustment causes an alteration in the tension of the selvage as compared with the ground and trouble is caused to the weaver all the time. On the other hand, the large circumference warping apparatus is rather unwieldy in character and is heavy to manipulate.

BEAMING.

When the warp has been completed and laid section by section on the surface of the drum according to the number of threads it contains, the next step in the preparation of the warp is beaming, where the warp is transferred to the beam of the loom. These are not so heavy as the beams of the woven fabric and the beaming process is not so rigorously carried out. As a rule we do not have an excessive number of threads and the warp does not require to be wound at such a high tension. At the same time, it is advisable to beam the warp with great care on the following points:

(a) The threads should be laid on the beam as nearly as possible parallel and next to those they have to stand beside in the frame. If one thread is several ends out of its place, then it is obliged to cross over these in the weaving operation thus giving rise to increased tension and liability of breakage.

(b) The warp threads have to be evenly spread over the surface of the beam for which it is advisable to employ some form of reed through which the threads are passed in three's or four's according to the number of threads in the warp and the sett of the dents in the reed. This makes the threads lie side by side on the beam in the exact order in which they are needed in the loom, that order in which they are required to pass through the eyes of the points of the guide bar. If the warp is of more than a given length, we require to make provision for sustaining the sides to keep them from falling over the edge. Slack edges cause the fabric to work slack under which condition it is almost impossible to form loops on the needles and even if formed they are of a larger size than those of the ground and so impart to the edge of the cloth a careless slovenly appearance which considerably decreases its saleable quality. Whilst the warp is passing to the loom beam, the worker should keep a strict lookout for any broken or slack threads which may have been left from the warping and these should be traced and remedied.

MINOR FAULTS.

If any thread is slacker than those which surround it, then the stitches formed from it are drawn longer and this at once makes itself noticed in difference of texture. What is worse is that because of deficient tension, the needle is unable to draw its proper loop and the stitch formation is imperfect. The needle may be unable to complete its stitch with the result that material accumulates on the stem and in a few courses a latch or spring will be severed thus causing a serious defect of texture at this point.

Even if the slackness is not so pronounced as to cause the stitch to miscarry, the loops so formed will be larger than those in the immediate vicinity and the defect will require to be remedied in the finishing, which spells increased cost of production.

Badly tied knots are also a source of trouble to the weaver and warpers should be chosen partly on account of their ability to tie proper knots. The mechanical knotter will at once suggest itself to the mind but unfortunately the kind of knot made by this apparatus, although very suitable for the weaving trade, is not so suitable for the heavier yarns of woollen or worsted character so often used in the warp loom product. The knot in these materials comes out large and cumbrous and there is difficulty in getting even a medium sized knot successfully through the eyes of the warp loom guides. If they do survive their traverse of the guide point with its small eye, the chances are that it will cause trouble to the spring of the needle, either breaking it off or bending it in some permanent fashion.

The best way is to secure the warp yarns wound on large cheeses and obtain these in sufficient number to complete the warp without any giving out. When the warp is being operated on the warp loom the tension of the threads is much less than is the case of the woven product and so the warp does not require to be so tightly beamed. Threads of warp have to undergo considerable friction in passing through the eyes of the guide points and also in forming their loops on the needles, so that certain classes of yarns frequently used in woven cloths are not suited for the warp loom fabric.

It is a mistake to use yarns which are too soft twisted or which are likely to shed a considerable portion of their surface material in working. Such fibrous material collects in the eyes of the guides and at the needle heads, obstructions which are certain to lead to trouble sooner or later. This is especially the case with ground yarns which have to intersect in loop formation at each course. More latitude can be given to thick soft yarns so often employed as fancy features of these cloths and where the intersection is considerably less than the ground yarns. All this of course has a further reference to the size of yarn used and the ability of the frame guage to accomodate this yarn; for the great majority of fabrics the yarn used is to the light side as compared with the gauge, and there is sufficient room for the processes of stitch formation.

From the description of the way in which the warp is intersected into loops and from a study of Fig. 2 it will be seen that this class of fabric has great possibilities in the direction of colored effects. In these times of scarcity of dyestuffs, we only require a few primary and secondary

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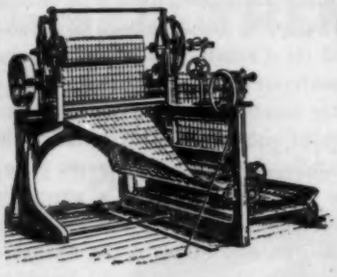

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colors and using these together on the warp loom, the characteristic fabric structure will provide a most efficient means of melanging to produce effects formerly associated exclusively with the dyer and his vat. In Fig. 2 the loops are seen to mix in a thorough manner and a simple stitch of this character is best for producing these melange or mixture effects. By the way in which the yarns cross and recross, we have produced a combination where the two colors lose their individuality and in the sense of vision mingle together to give a new shade. This is done in the fabric itself, but if it is required to make the mixture perfect, all that is needed is to subject the cloth to treatment on the brusher which will rapidly raise the fibres of both yarns to the surface and blend them most effectively.

Among the Knitting Mills.

It is reported that a new knitting mill is to be established at Danville, Va. The chief promoter is J. Allen Crews of Wharton, N. J., who is representing a number of New Jersey capitalists in this undertaking. The details have not as yet been completely arranged and no definite announcement for publication is being made.

The Southern Hosiery Mills at Burlington, N. C., will soon be in its new plant. This is large enough to allow for considerable future mechanical enlargement. L. C. Chrisman, who was financially interested in this mill, has sold his holdings and moved to Mt. Airy, N. C., where he is operating another mill as reported in last month's issue. Chas. J. Boland continues in charge of the Southern Hosiery Mills as manager.

The Walker Hosiery Mills Co., Burlington, N. C., recently incorporated with $100,000 capital, has organized and has an equipment of 300 knitting machines. It will build (next spring) a one-story 150 by 75 foot brick building costing $5000. R. K. Lasley is president; D. D. DeMoss, vice-president; C. A. Walker, secretary-treasurer.

A new company is to take over the Maryville (Tenn.) Hosiery Mills property, the machinery from this plant having been sold several months ago. The buildings are to be remodeled and new machinery is to be installed, so that the plant will represnt an investment of $50,000. It is reported that a force of 100 operatives is to be employed.

Machinery has been ordered for the Atkinson (N. C.) Hosiery Mills Co. The equipment includes 25 knitting machines, 6 ribbers. 5 loopers and a 40-horsepower steam plant with belt drive. The equipment will be installed in a one-story 60 by 40-foot brick building which the company will erect, and the plant's daily capacity is 175 dozen pairs. This Atkinson enterprise recently chartered with $100,000 capital has organized with these officers; E. A. Hawes, Sr., president; J. T. Hazzard, vice-president and treasurer; J. W. Flynn, secretary.

The People's Hosiery Mills at Wilmington, N. C., which have been incorporated in North Carolina, with a capital of $100,000, of which $25,000 is to be paid in by the time operations start, will be ready for business in the near future is it understood. A site in the northern part of the city has been selected and contracts will soon be let for buildings, machinery, etc. The officers of the company are E. Fred Banck and E. T. Burton.

The Piedmont Hosiery Mills Co., Lawndale, N. C., recently organized begins manufacturing with a daily capacity of 200 dozen pairs of hosiery. It is capitalized at $50,000, and will operate 20 knitting machines, driven by electric power. W. R. Newton is president, and Decatur Elmore, vice-president.

W. C. Thurston has started a new hosiery plant under the name of the Curio Hosiery Mills at Burlington, N. C. The plant is to be equipped with 20 knitting machines and 8 sewing machines at first, and the owner hopes to continually increase this number. Electricity is used to run the machinery. J. J. Henkins is superintendent in charge and W. C. Thurston does the buying.

The Olive Hosiery Manufacturing Co., Shelby, N. C., is going to erect a dyehouse. The mill manufactures men's half hose and has an equipment of 100 knitting machines.

The Holly Bush Knitting Mills which have just been organized by C. T. Morrison and C. S. Grove of Hickory, N. C., will be operated by water power and will start up with 40 machines. A suitable building has been secured and the owners will install an equipment of machinery for a daily production of 200 dozen pairs of hose.

The Freeze-Bacon Hosiery Mills, Hendersonville, N. C., will increase capacity.

A hosiery knitting mill will be established by A. B. Cook, Gastonia, N. C., the machinery having been purchased.

Fire, November 7, destroyed the hosiery manufacturing plant of William G. Leininger, Mohnton, Pa., with loss estimated at about $50,000. The plant will be immediately rebuilt.

Frank Y. Litzmiller has acquired the Bally Hosiery Mills at Bally, Pa., and is planning to increase the capacity by extensive improvements and additions.

The Shifreen Lipschutz Knitting Mills, Brooklyn, N. Y., have been incoporated with a capital of $20,000 to operate a plant for the manufacture of knit goods. D. and S. Shifreen and E. L. Lipschutz, 339 Van Sicklen, Avenue, Brooklyn, are the incorporators.

Baxter, Kelly & Faust, Philadelphia, Pa., manufacturers of cotton goods, have awarded a contract for the construction of an addition to their plant on Tioga Street. Fred A. Havens, 843 North Ninteenth Street, is the contractor.

The Triangle Textile Company, Reading, Pa., has been incorporated recently to manufacture hosiery. The company has acquired a new factory building at a price of about $15,000 and is planning to inaugurate operations at an early date. G. Fred Mertz, P. Henry Fisher, and Harry E. Katzenmoyer, all of Reading, head the new company.

Dykeman, Neill & Loeb, 615 Chestnut Street, Philadelphia, Pa., converters and manufacturers of cotton goods, have announced the removal of the New York office to the American Woolen Building, 221 Fourth Avenue, New York.

A. L. Nathan & Heyman, Inc., New York, have filed articles of incorporation with a capital of $50,000 to manufacture cotton goods of various kinds. S. and S. A. Heyman, and A. Heyman, and A. L. Nathan, 160 West Eighty-seventh Street, New York, are the incorporators.

Simon Ascher & Company, 390 Fourth Avenue, New York, manufacturer of knit goods, have awarded a contract for the construction of a new five-story addition to their plant, about 30 x 90 feet, to cost about $20,000. George Hoffman, 1071 Washington Avenue, New York, is the contractor.

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